COMPUTERWORLD

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NEWSPAPER

Ready... Set... Wave Your Wands

Now that the humming and buzzing of electronic cash registers is a noise readily accepted by most shoppers, a new sound is being introduced in point-of-sale (POS) systems – the beep of optical scanning wands reading machine-encoded information from sales tickets. *Computerworld* looks at the status of computers in retailing in a mini report beginning on Page 5.

Imsai 108 Intelligent Disks Ease Construction of DBMS

By Vie Farmer
Of the CW Staff

SAN LEANDRO, Calif. – First it was intelligent terminals . . . and a healthy rethinking of computer architecture.

Now it is intelligent disks designed to ease the construction of data base management systems (DBMS).

The Imsai 108 from IMS Associates, Inc. is basically a disk controller with space for up to 64 microprocessors and a 450 nsec cache memory of up to 128K bytes connected to up to 16 California Computer Products Trident disk drives. The cache memory is shared by the microprocessors.

This powerhouse can be connected to multiple CPUs and/or terminals by RS-232C communications interfaces, I/O bus parallel interfaces or direct memory access, IMS Associates said.

The controller takes data base access function load off the CPU and allows the user to talk to the disk in terms of just discrete records.

Five interacting microprocessors, as well as a DBMS in the basic controller configuration, enable the user's CPUs and intelligent terminals to deal with symbolically named files, records, and fields.

For example, the actual character string, "Read, Filename, Recordname, Fieldname," is transmitted to the controller, which responds with the string "Fieldvalue," the company said.

Under the data base access protocol imposed by most information storage and retrieval applications, only host commands and specified data fields will pass between the host and the controller, the company added.

No Disk/CPU Communication

All indexing, searching and deblocking operations are performed by the controller, the firm stressed, avoiding most of the device/CPU communication common to less intelligent disk systems.

If a user finds the basic five microprocessors are not capable of handling his specific applications, he can tack on more processors – up to 64 – to provide more dedicated power to meet a requirement, the company said.

The controller can talk with as many as

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Files Argument With High Court

U.S. Attacks Concept of Software Patents

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – This time around, the U.S. Supreme Court should decide "whether programs for existing general-purpose digital computers, however claimed, are patentable under present law," according to U.S. Solicitor General Robert H. Bork.

"The translation of an idea into a program for a . . . computer no more imparts patentability to the idea than does the translation of the idea from English into French or from English into Fortran (or any other computer language)," Bork contended.

Bork raised that argument in a brief filed with the court late last month for its consideration in the planned review of the software patent granted Thomas R. Johnston [CW, May 21].

Acting for Patent Commissioner G. Marshall Dann, he told the justices he saw two questions they should consider, beyond the basic ones of patentability for software.

First, does the court's holding (in the 1972 Benson-Tabbott case) that an idea implemented by programming is unpatentable when claimed as a "process" also apply when the programmed computer is claimed as a new "machine system"? he asked.

Secondly, the court should decide "whether [Johnston's] idea of having banks provide an additional bookkeeping service by programming their computers to sort check and deposit data in accordance with category codes was in any event no more than an obvious improvement over prior art," Bork said.

Johnston's Program

Johnston's program enables banks to provide basic accounting information to small business clients, based on codes added to the normal string of magnetic ink characters along the bottom of the client's checks and deposit slips.

The software provides subtotals by cate-

(Continued on Page 3)

Xerox DP Users Probe Support Proposals

By Nancy French
Of the CW Staff

EL SEGUNDO, Calif. – Concerned Xerox users met with company officials last week to seek details on how their systems will get future support. Included in the meeting were the Executive Committee and members of the Xerox Users Group and Xerox Data Systems Division (DSD) management [CW, July 30].

Jack Lewis, DSD president, and Bob Adams, DSD vice-president of marketing and business development, who met with the 31 users, gave them "general assurances" their needs would be met and promised answers "very shortly" to the list of 100 questions prepared by the group during its two-day meeting.

However, they did not provide any information about the acquisition rumors now being discussed in the industry, J.B. McAlpin, chairman of the Xerox Users Group, said.

While reluctant to discuss the questions the users had prepared before they are actually submitted to Xerox, he did say they include a request to spell out what Xerox meant when it pledged to "meet its commitments" as well as a request for specifics on what kinds of hardware, software and training support the users can expect to receive over the next seven years.

The Executive Committee stayed through the week to formulate procedures for communicating with one another as new information becomes available.

The users' statement was brief. It noted the "disappointment and dismay" they felt over Xerox's decision to withdraw from mainframe manufacturing "particularly in light of the years of constant assurances that Xerox was in the computer business for the long haul.

"Xerox computers are recognized for the unexcelled capabilities and versatility of the operating system and the reliability and cost-effectiveness of the hardware," the statement said.

The decision will be "a great loss, not only to the existing customer base, but also to the entire computer industry," the statement said.

"We are hopeful that a progressive company will recognize these qualities and purchase DSD intact, including the international operation, and continue the innovative direction Xerox has established.

"Right now, we have nowhere to turn for comparable hardware, software, concepts and general data processing strategy," McAlpin said.

Noting that Xerox management has assured them that the company will "live up to all its moral as well as legal commitments," even though a suitable purchaser is not found, the statement said they realized "extraordinary efforts would be required" from all parties involved.

The Users Group itself intends to remain an active and viable force, the statement said.

"We will continue our established activities and expect to participate in all appropriate ways in regard to possible divestiture or the orderly phasing out of the computer mainframe business by Xerox."

Nasis Denounces Federal Edict Requiring Dedicated Systems

By Ronald A. Frank
Of the CW Staff

LACONIA, N.H. – "We in state government disagree with being told how to conduct the affairs of state government" by Washington bureaucrats, Glenn W. Goodwin, president of the National Association for State Information Systems (Nasis), told the audience at the organization's annual conference held here last week.

Almost every state has consolidated its DP resources for efficiency and economy, especially small- and medium-size states, Goodwin told more than 75 state DP representatives from 39 states and one Canadian province.

"Today the shared computer is prevalent in government and industry," Goodwin said, "and yet the Federal Government wants the states to dedicate individual DP systems to criminal history information" [CW, July 30].

"Nasis does not object to any state's decision to dedicate a computer to criminal justice use or to place the dedicated computer under the management and control of law enforcement officials.

"But Nasis does object to the federal attempt to force all 50 states to make such a decision, even though it may be contrary to local statutes or administrative regulations," Goodwin said.

On June 18, Nasis sent a letter to U.S. Attorney General Edward H. Levi to explain the position of the organization. And, on July 11, Nasis received a reply from Richard W. Velde, administrator of the Law Enforcement Assistance Administration (LEAA) of the U.S. Department of Justice.

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USSR Denies DPer Visa for U.S. Job . . .

By Josepb Hanlon
Special to Computerworld

MOSCOW – "By no means do I want to leave the Soviet Union. But the alternative is worse – the only alternative is prison," Valentin Turchin, a computer scientist and associate member of the Association for Computing Machinery (ACM) said in an interview at his suburban Moscow apartment last month.

Turchin has offended the Soviet government by protesting irregularities in the trials of dissidents and the treatment of dissidents in prison and by pushing for democratic reforms in the Soviet Union.

In 1973, Turchin helped form the Soviet group of Amnesty International and became chairman of the group. But a year ago he lost his job and no one is permitted to hire him.

Interrogated at Length

Since April, Turchin's apartment has been searched and papers taken; he has been interrogated at length six times.

"Until April, I had hoped I should manage somehow," Turchin said. Now he feels there is no alternative but to leave the USSR. He has been offered a job at Columbia University, but the Soviet government will not give Turchin an exit visa.

Originally a theoretical nuclear physicist, Turchin slowly shifted to computer science and, in 1964, joined the prestigious Institute for Applied Mathematics. His increasing dissident activities, however, made life difficult there.

Despite his outspokenness, he was offered a post as head of a laboratory at the Institute for Automated Systems in the Building Industry, and he took up the new job in March 1973.

Soon after, the Soviet government launched a campaign against academician Andrei Sakharov, the highest ranking dissident in the science community. In September 1973 Turchin made a statement in support of Sakharov. A week later, he said, his lab was closed down and he was demoted.

Another statement in defense of Sakharov brought Turchin's dismissal the following July; he has been unable to find work since then.

Turchin is pessimistic about the movement for democratic reform, which has declined in the past few years in the face of government pressure – "Some people have received seven years in jail for a single sheet of paper," Turchin said.

He is also pessimistic because he and others had hoped for more public response to the idea of "slow democratic reform" when the movement began in the 1960s. But the response did not come because Soviet society had become "more dehumanized than we could foresee," he said.

This dehumanization, Turchin said, has had its effect on science: "technically, we eat crumbs from the table of Western science, because people are prevented from creative thinking."

Curiously, science flourished during the severe repression under Stalin, he said, because the eccentricities of scientists were tolerated as long as they did not become political.

With less severe repression now, "any creative thinking is a potential threat," so only political hacks are promoted, he said.

. . . Bars Second From Meeting

By Edith Holmes
Of the CW Staff

COLLEGE PARK, Md. – An American professor here has triggered a movement protesting the USSR's refusal to allow a Russian scientist to attend an international conference.

Dr. Jack Minker, professor and chairman of the Department of Computer Science at the University of Maryland, recently wrote a letter to the members of the Association for Computing Machinery's (ACM) Special Interest Group on Artificial Intelligence (Sigart) protesting the exclusion of Dr. Alexander Lerner from the International Joint Conference on Artificial Intelligence (IJCAI) to be held Sept. 3-8 in Tblisi, USSR.

Minker's letter asked the some 2,700 members of Sigart to write to the program committee for the IJCAI, requesting the site of the conference be moved from the Soviet Union.

Invited to participate on a panel at the IJCAI, Lerner, a 63-year-old mathematician, was informed by the KGB that he would be barred from accepting the invitation and that he should withdraw his application to emigrate, according to an article in the *New York Times*.

Calling the Soviet action "a major breach of accepted scientific standards at international conferences," Minker referred to a resolution on political nondiscrimination in such scientific activities established by the International Council of Scientific Unions (ICSU).

That resolution "affirms the right of the scientists of any country or territory to adhere to or to associate with international scientific activity without regard to race, religion or political philosophy."

"The Soviet Union is a signatory to the ICSU standards and yet chooses to ignore them," he wrote.

Minker also reminded Sigart members that the ACM council has urged ACM members "not to participate in international conferences where a host country does not abide by the ICSU standards." He added that Lerner himself is an ACM member.

"Willful disregard of international standards cannot be met by excuses which ignore such behavior. It must be met by a firm insistence that international standards be upheld," he wrote. "Any deviation from such a firm stand can only abet tyrannical behavior."

As of Aug. 1, both Minker and the program committee for the conference had received 315 responses from Sigart members asking that the conference site be changed and noting that if the meeting were held in the USSR, they would not attend.

Another 85 wrote that they believed the conference should be removed from the Soviet Union, but did not say they wouldn't attend.

Six others indicated the conference should remain in Tblisi, Minker said.

He noted responses came not only from the U.S., but from ACM members in Japan, France, Canada, West Germany, The Netherlands, Great Britain, Australia, South Africa, Puerto Rico, Argentina, Israel, Mexico and Greece.

The IJCAI Organizing Committee meets every two years to plan this conference, is not associated with any of the societies and includes three Soviet scientists. It has decided to keep the conference in the USSR.

But some of the members of the committee are planning and will carry out protests during the conference if Lerner is not permitted to attend.

Those committee members involved do not feel at liberty to detail what forms protest will take, but Minker is certain "it will be in good taste,"

Observers indicated that, if a protest is held in Tblisi, it will be the first time such action has been taken within the scientific community at an international conference.

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As Supreme Court Case Nears

Vendors' Views on Software Patent Protection Mixed

By Don Leavitt
Of the CW Staff

As the Supreme Court gets ready to review the Thomas R. Johnston software patent [CW, May 21], developers and observers of the industry have mixed thoughts on the pros and cons of that form of protection in general.

Some, like Glen Chatfield, president of Duquesne Systems in Pittsburgh, Pa., are very much in favor of patenting.

Others, including William Newcomber of Dylakor Systems in Encino, Calif., see potential problems and little advantage, especially for the small vendor.

Still others – Worth Eckard, general manager of software at Tesdata Systems Corp. in McLean, Va., and Larry Welke, publisher of *ICP Software Directory*, among them – fall somewhere in between these extremes,

The high court's willingness to review the Johnston patent is "very interesting" to Chatfield, who is hopeful that "this time around, we can get a clear-cut and meaningful decision." The decision on the Benson-Tabbott case in 1972 was "a very nebulous one, kind of a hard one to pin down to specifics. It left a lot of room for interpretation," he said.

Duquesne is committed to the concept of patenting and has an application pending on part of its Quantitative Computer Management (QCM) package. "There can be some real problems that come up if there isn't some very, very meaningful protection," Chatfield said.

Trade-secret protection is flawed for system software such as QCM, he argued, because, as a matter of policy, the user must let IBM look at all major system failures and problems.

"When a main storage dump is taken, [the software vendor's] code lays in object form in that system. Anyone who is very knowledgeable knows you can do a fairly decent job in 'reverse translating' to get back to at least a pseudo-source language. This more or less reveals the concepts, patterns and ideas of the vendor's software."

Today's debugging is done in real-time, he went on, and there is often no way the vendor can take any action to protect that object code from inspection.

Unless a vendor takes "every possible precaution" to keep his "secret" just that, a court might well throw out any claims brought against a competitor's use of that secret, he said.

Copyright protection is generally a weaker option still and has comparable problems. In any case, vendors who have investments ranging in the hundreds of thousands of dollars, as Duquesne has with QCM, deserve a substantial form of protection, he argued.

At Dylakor, Newcomber manages another development project that has involved a great deal of money over the years, but he doesn't see patent protection of any special use to his kind of operation.

The firm made its name by renting its products for minimal charges (a dollar a day for DYL-250).

"Suppose someone copies our program and uses it without authorization. If we stop him after six months, what are our damages? $180, roughly," he said, adding quickly, however, that the company wouldn't rule out pursuit of invalid users just because of the low "damages" involved.

On a different tack, he noted that the "property tax on software" issue may well be raised again in California after lying dormant for two years. And a decision – pro or con – on program patentability could affect how the tax issue goes, in his view.

If software is found to be patentable by the highest court in the land, the argument goes, it adds stature to the taxing authority's claim that software is "real property."

In Indiana, Welke said he felt patent protection probably should be available to developers or vendors of system and utility-type software, which is geared to work in very specific ways which cannot be – perhaps "should not be" – altered by the end user.

Most application programs, however, really don't deserve that shell of protection, he added.

In Virginia, Eckard markets a number of packages that fall somewhere between "application" and system software.

Instead of protecting his program's logic, he distributes it to his users and lets them work with it freely. This helps the vendor, ultimately, in improving the package, he said.

U.S. Attacks Concept Of Software Patents

(Continued from Page 1)

gory code as well as more conventional totals on the client's entire account during each reporting period.

The "means" Johnston utilizes are those of an "ordinary, general-purpose digital computer . . . with a program [that works] in the conventional way the computer performs such tasks," Bork contended.

Elsewhere in his brief, Bork noted that a general-purpose digital computer "is designed to operate under a variety of different programs to perform diverse data processing operations. Flexibility is its essence."

Johnston's contention that his program turns the computer (in this case an IBM 1400 series system) into a "new machine," is "a strained and unreasonable conception of identity and difference," Bork said.

The solicitor general acknowledged that "the dynamic interrelationship between . . . computers and the software programs through which they are applied to numerous and varied tasks may call for new measures or legal concepts to further reward and stimulate innovation in programming."

He then noted that, in the Benson-Tabbott case, the court had asked Congress to determine how programs are to be protected.

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Nasis Opposes Edict Requiring Dedicated Criminal DP Systems

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The reply said, "in our view, the dedication of criminal justice information systems is the best possible method to assure there will be no technological potential for the interface of data. Because of the increase in availability of low-cost mini and microcomputer systems, the arguments that shared systems are more economical have little validity.

"In fact, the complexities of the operating systems and the capacity needed to provide for responsiveness for all users frequently make large systems less economical," Velde wrote.

One of the most serious threats to privacy can result from the development of de facto dossiers by linking files from various sources, Velde wrote to Nasis.

"We continue to be confronted by the arrogance of faceless bureaucrats, the concentration of too much power in the hands of a few and the continuing erosion of state and local government autonomy in the criminal justice field," Goodwin told the conference.

Several speakers during the conference called on the state DP administrators to challenge the Department of Justice on its edict requiring the dedicated criminal information systems. Included as possibilities were a court suit either by Nasis or in concert with the National Governors Conference and open defiance of LEAA requirements by the states.

Both methods were apparently suggested to test the power of the Federal Government to impose its regulations on the state governments.

DP-Related Grants

Despite its differences with the government on the criminal history issue, Nasis officials reported that the organization is working with the National Science Foundation to obtain DP-related grant funds. Included are potential studies of the educational requirements needed for those who work for state DP agencies to develop career paths and updated job specifications.

Also included would be contacts with vocational schools and colleges to define what skills are required for DP staff members. This would be an entire study of the human resource portion of the DP equation, according to Charles Trigg, Nasis associate director.

Another project would study ways to measure the productivity of the DP information system.

The organization has made a proposal to the Computer and Business Equipment Manufacturers Association (Cbema) to study the transferability of software systems from state to state.

Included would be an investigation of the ways to design and document the software system to facilitate a transfer and then test the results. There is a current proposal before the National Governors Conference to see how state information departments can serve the governors' offices directly. Most do not now provide services that do this, Trigg said.

Nasis is working to obtain closer ties with the Federal Government, especially in the area of accounting methods, according to Carl Vorlander, executive director of the organization.

Nasis Fights LEAA Regulations

LACONIA, N.H. – Members of the National Association for State Information Systems (Nasis) have launched a last ditch "action plan to combat Law Enforcement Assistance Administration (LEAA) regulations" that call for the use of dedicated computers in criminal justice systems.

At its annual business meeting, the organization passed a resolution to "intensify its efforts to obtain a reversal of the policy decision from the Department of Justice concerning dedicated computer systems."

In a position paper, Nasis said, "if the Justice Department is allowed to dictate dedicated computers, other federal agencies will get on the bandwagon."

All member states were asked to come up with estimated cost figures on dedicating computers to law enforcement and also cost figures on the total decentralization of data processing operations.

It was agreed that Nasis and the National Governors Conference (NGC) will jointly request a meeting with the U.S. Attorney General's office. "We will attempt to get the message across that this is our last attempt to work with LEAA," the position paper said.

Both Nasis and the NGC will also attempt to set up a meeting between "several concerned governors and U.S. Attorney General Edward H. Levi" and the cost figures associated with decentralization will be "presented to Treasury Secretary William E. Simon, and he will be requested to intervene on behalf of the states."

A possible "direct communication with President Gerald R. Ford" was also mentioned in the position paper.

LEAA Issues Requirements

LACONIA, N.H. – In a continuing effort to require state governments to operate their criminal history DP systems on dedicated computers, the Law Enforcement Assistance Administration (LEAA) has issued security and privacy regulations.

The regulations specify what planning states must do if they are to receive LEAA assistance in setting up dedicated criminal history systems. Failure to comply could lead to a state being cut off from LEAA funds.

To qualify for LEAA aid, states must submit a plan and application by Dec. 16 "to set forth operational procedures to guarantee the security and privacy of criminal history record information."

"All states and local agencies receiving LEAA money after July 1, 1973 for manual or automatic systems which collect, store or disseminate criminal history record information" are subject to the regulations, according to a LEAA document titled "Privacy and Security Planning Instructions."

This document was issued "to provide clarification and explanation of the Department of Justice rules and regulations governing criminal justice information systems."

To provide for the security of criminal history record information, states that want LEAA assistance must provide details "relating to hardware dedication, protection of physical facilities and selection training and supervision of employees," the LEAA document said.

Sole Use of Hardware

"Specific hardware which would have to be used solely for criminal justice purposes includes storage devices (such as disks, tapes or mass memory units of other kinds), terminals employed in accessing the criminal offender records, modems or other devices used to interface equipment with communications systems, the processor used which has the function of controlling access to the records by receiving the inquiry and initiating any response to the inquiry and any other processor used for updating files or otherwise handling criminal history data," the LEAA document said.

To control access, states are urged "to use a separate computer . . . precisely engineered to handle the telecommunications function. These so-called 'front-end' computers are physically distinct from any other processing unit which may be used," the document said.

The plan to be filed by the state "should contain a thorough discussion of the approach taken to meet these requirements."

All procedures spelled out in the LEAA document must be operational by Dec. 31, 1977. "Failure to provide an adequate plan . . . may subject the state to partial or total funds cutoff by LEAA and to the imposition of a $10,000 fine," the document said.

IMS Associates Adds Intelligent Disks

(Continued from Page 1)

256 different CPUs or terminals at the same time, the company claimed.

The multiple microprocessors interact on three distinct levels: communications, data base management and disk driver. They pass task through a "mailbox" scheme, so that there can be multiple microprocessors on each of the three levels constantly seeking and doing work simultaneously.

The company anticipates the system will be attached by users to terminals, such as IBM 3705s, minicomputers and even larger mainframes. No, or very few, software modifications are required, it said.

Each disk spindle handles 54M bytes on a five-high disk pack. The transfer rate is 806 kbyte/sec, and maximum track-to-track access time is 6 msec.

The Imsai 108 costs $29,500 in a single spindle configuration and $47,500 in a two-spindle configuration from the firm at 1922 Republic Ave., 94577.

[illegible]

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And UPC Has Hit Bumpy Weather

UVM Scan Code Full of Promise – But Little Progress

By Toni Wiseman
Of the CW Staff

Scanning has been a major buzz word in all point-of-sale promotion, but what is the present status of the technique?

Nine months have passed since the National Retail Merchants' Association (NRMA) adopted its voluntary Universal Vendor Marking (UVM) code. To date, however, little progress seems to have been made in instituting widespread use of UVM.

OCR-A was chosen as the standard UVM technology because the group felt it represents "the most desirable technology at this time for use by the general retail industry.

"Its characteristics as a printed, human-readable medium give it broad opportunity for use with existing price ticket printers, computer printers and other printing devices," the NRMA said.

The supermarket industry, on the other hand, has already implemented its chosen scanner technology, the bar-coded Universal Product Code (UPC). Industry figures estimate 65% of all goods sold in supermarkets will be marked with the UPC for scanning by the end of 1975, even though few chains have progressed to widespread use of scanning devices.

The implementation of UPC has hit some bumpy weather, however. The supermarket industry's proposal to remove conventional price markings from packages has generated widespread reaction from consumer groups and legislators alike.

A Maryland bill requiring price marking, for example, died in a state Senate committee; a similar measure passed the Illinois House and a Senate committee, only to be killed on the Senate floor for a lack of seven votes.

In Chicago itself, however, a strong city ordinance requiring price marking on all products passed by a 45-to-1 vote.

Virginia legislators killed a price-marking bill because they did not feel automated checkout systems have been given a fair chance yet; in New York state Sen. John J. Santucci's (D-Queens) bill is in limbo until the Legislature reconvenes in January, 1976.

In addition, Sen. Frank Moss (D-Utah) and Harold Ford (D-Tenn.) will be presenting bills to Congress early this fall.

Escape From Censure

Retailers will at least escape the censure of consumer advocate groups when it comes to the question of price marking. The OCR-A font is human-readable and NRMA specifications call for all pricing information to remain on merchandise tags.

While other problems still face the proponents of UVM, progress is all but stagnant. At best, national department stores and major manufacturers are testing the feasibility of OCR-A scanning.

At the moment, however, no brand-line merchandise vendors are shipping merchandise with tickets or labels adhering to the UVM standards to conventional department stores.

One deterrent to the widespread use of UVM, in the view of many manufacturers, is the lack of a commercially available batch reading device for OCR tickets. This means stores must use expensive wand equipment which smaller volume stores cannot afford.

Hopefully, as more stores get into scanning, the prices on equipment following the traditional volume/cost curve that has been applicable in the electronics industry, will start coming down.

Confronting the Problem

Still, major manufacturers are confronting the problems, if somewhat slowly.

The L'eggs division of Hanes Hosiery will begin marking packages with the UPC this fall because "all our major customers are going to UPC systems now or in the near future, so we're being forced into it," according to a L'eggs spokesman.

L'eggs are sold in supermarkets; other brands of Hanes hosiery are distributed through department stores. Hosiery sold in department stores has for some time been marked with the long-established NRMA print-punch tickets.

The different marking does not, however, produce a problem since the two lines of hosiery are completely separate in terms of production.

The toy industry has been working closely with the NRMA since the adoption of UVM, but has thus far been stymied by technical questions regarding positioning of marking and other specifications.

As a whole, the toy industry will probably not be in a position to begin widespread marking until late 1977 or 1978, according to Cliff Jacobs of Mattel Toys, since most manufacturers are already well into their 1976 product line "and large amounts of scanning equipment will not be available until then anyway."

Munsingwear has been using Kimball print-punch tickets on lingerie since 1965, but is opposed to using tickets on men's apparel because "we have gotten no benefits from the tickets; it's just been an extra effort on our part," according to Tom Carlson.

"In lingerie we always had a descriptive ticket with our logo on it, so it was no big effort to continue in that direction and easily adapt the ticket for UVM," he said.

"But in the men's area, the trend is away from marking garments with suggested retail prices, so we would have to add an extra step, of adding a label, at great expense to the manufacturer."

Levi-Strauss is currently setting up a test for OCR-A with Foley's department store in Houston to determine the feasibility of the new technology. But once again, the company is looking at a three-to-five years from now timeframe, according to Jim McDonald, "if it goes through."

The possibility of retailers converting to UPC or adding UPC to their current tickets has been kicked around for some time now, and again, no definite decision is evident.

As one industry figure pointed out, there are no Warner bras or Arrow shirts in the A&P, and Kellogg's Cornflakes are not an important seller in Bloomingdale's or Saks. The department stores will have to work out their own methods for handling cigars and toothpaste.

While the question of equipment vendors should be examined here to decide whether they favor compatibility between retailing and supermarket codes, the issue becomes clouded when one realizes that two of the major point-of-sale equipment suppliers, IBM and NCR, have introduced their own ticket technologies (IBM magnetic and NCR three-color bar code).

"Theoretically, it should make no difference to vendors of computer equipment whether there is one or a great variety of marking technologies used by their customers," Phil Brail of Kimball Systems said.

"The assumption is that by the time data is input to the computer, it is compatible with the computer's requirements and that it is the user's responsibility to assure that compatibility," he said.

Computers at Work in Retailing

"Retailing: Where is it? Where is it going?" are two questions which have to be updated daily.

While no major technological innovations have come to the forefront during the past year, the pervasiveness of point-of-sale (POS) applications and their relation to the everyday life of each individual has had a great impact and bears examination.

Most significant is the manner in which POS equipment and its uses is changing the habits of the average American.

The proposed removal of pricing information from supermarket goods, for instance, could have a widespread effect on shopping habits, while the proposed "giant vending machines," minimarkets of the future and phone ordering systems will certainly revolutionize retailing as it is known today.

But while we wait for the future to arrive, computer equipment is more and more in evidence in department stores and supermarkets. This report will examine some of the applications the industry is proposing for the future, as well as those which data processors and laymen alike are experiencing right now.

Point-of-Sale History Only 25 Years Old

By Richard P. Shaffer
Special to Computerworld

In 1970, I stated that "the introduction of electronic point-of-sale was to the retail industry what a rocket landing on the moon was to the world in general."

Now it is 1975, and we have a considerable amount of history and experience with which to evaluate and qualify that statement.

The history of electronic point-of-sale (POS) really began in 1950. After the Korean War, computers which had been developed for the use of the U.S. Armed Forces began to be considered for the processing and handling of business data.

One group of large independent retail department stores decided to appoint a business machines committee to examine the field of electronic development and test possible applications to department stores operations.

This effort is noteworthy because it was one of the first attempts at investigating information requirements before selecting equipment. In fact, at the time the project was started, very little equipment was available from which to select.

In essence, the business machines committee worked with the business machines manufacturers in developing equipment which would satisfy the information and data processing needs of the stores. By 1953, the committee had fairly well established the stores' specific machine capacity requirements, which it passed on to the manufacturers.

Although many of the larger manufacturers were interested in the development of computers, the only company interested in producing an integrated system with a POS device in 1953 was Radio Corp. of America (RCA). By the spring of 1954, a contract was negotiated with RCA, which promised equipment delivery in 1956.

The RCA Bizmac computer was finally installed at the Higbee Co. in Cleveland in 1956, where the important work of final programming, debugging and reporting began.

Additional experimental work was being carried on at the same time in other committee stores. NCR was testing its new Salestronic register at the Rike-Kumler Co. in Dayton in conjunction with its experimental 303 computer. Dayton's of Minneapolis was testing Remington Rand's Telecomputer, while Bullock's, Inc. in Los Angeles was experimenting with Clary Transactors and Rich's of Atlanta programmed and operated payroll experiments using Georgia Tech's IBM 650 computer.

By the spring of 1959, testing of the practical applications of electronics to the accounting areas at Higbee's in Cleveland was completed and the Bizmac equipment had been sold back to RCA. It appeared that the concept was ahead of the technology.

In the early 1960s, Unitote introduced the 101 series of POS terminals, which was perhaps the beginning of the use of a cash register as an input device to collect data.

By the late 1960s, scientific developments made the concept of an on-line electronic POS device for gathering merchandise information, checking credit and communicating with a central computer a feasible objective. Many firms with technical expertise sought to enter the market, concentrating primarily on the department and specialty stores.

These pioneers included Alpex, Anker Data Systems, Friden, Information Machines Corp., Olivetti, Regitel, Ricca Data Systems, Sweda, Total Machine Development Corp. and Transaction Systems.

Others sought to capture the supermarket industry, including Datachecker, Dymo, MSI, Nuclear Data, RCA and Threshold Technology.

Still others, such as Addressograph Multigraph and Data Terminal Systems, sought the fast food market.

As we entered the early 1970s, other vendors made clear their intentions to enter the POS market. These included Datatrol, IBM, First National City Bank, NCR and S-Cubed.

POT of Gold

At the same time, it was recognized that other Points-of-Transaction (POT) devices could lend themselves to more sophisticated on-line techniques, as in the areas of demand-deposit banking, total reservations, gasoline stations, restaurants and liquor dispenser control.

It looked like the computer industry was faced with an idea whose time had arrived. However, there were dark clouds along the rainbow to this POT of gold.

First, General Electric, which had worked so hard to develop a POS system in conjunction with the J.C. Penney Co., announced it was giving up the struggle.

Many of the other POS manufacturers either closed shop, sold out to an allied business, combined with other manufacturers or limited their operations.

And new competitors entered the race: Bunker-Ramo, TRW and Univac.

POS Market Finite

However, unlike computers, POS terminals have a rather well-defined limit of applications. Thus, statistics have indicated the total market for electronic POS in department, discount and specialty stores is more finite than infinite.

While the chains are expanding sales, they are not necessarily increasing the number of selling units. On the contrary – they are converting from smaller selling units to larger selling units and not dramatically increasing their need for

(Continued on Page 6)

Begins With Need Recognition

Success of POS Site Starts Before Equipment Ordered

By Randy L. Allen
Special to Computerworld

A successful point-of-sale (POS) installation begins long before the equipment is ordered or received. In fact, it begins long before the first terminal is even considered. .

Computers At Work In Retailing

When does it begin then? It begins when you or someone in your company recognizes a need or a requirement for automated transaction handling, reporting and inventory control. At that point, POS may not even be mentioned or considered.

POS becomes a factor when it becomes apparent through investigation of solutions to the need or requirement that POS is a potential solution.

In the case of Marks of Harvey, Ill., for example, the need or requirement was for better control. Marks is a men's and women's apparel store with a medium- and high-priced line of goods drawing on mostly nonlocal customers.

Two years ago, company controller Jim Selle and owner Bob Marks recognized the need for tighter control of floor procedures and inventory and more timely inventory information.

Recognizing the need led them to seek solutions to it, which in turn eventually brought up automation and POS.

At Marks, to this point, we have the controller and owner recognizing a need and a potential solution, but they are not yet committed to the solution.

Selle recognized the capability of DP and POS to solve the need and, because of prior background, felt comfortable with them as a solution. Through investigation of POS and computer services, Marks and Selle had demonstrations and explanations of the POS equipment suited to their environment.

Next Step

Having made a decision on POS, what is the next step?

The next step begins with selection of a vendor or vendors of equipment and services. This selection should be done carefully. Factors which should be considered in selecting equipment include ease of use; cost; reliability; financial stability of the equipment supplier; use by other similar retailers; and flexibility to meet changes in your business.

In considering a computer service company for service, consultation or software, you should consider retail industry expertise; financial stability; retail applications available and tested; reputation in the retail community; data security and backup; and commitment to continued development to meet changing industry needs.

At Marks, as Marks and Selle convinced themselves POS and automation were a solution to their need, they also began the process of selecting vendors. They had demonstrations, analyzed the capability of vendors to meet their requirements and checked vendors' reputations with other retailers.

They then selected two vendors, one for computer service and one for terminals.

You have now identified a requirement, found a solution and selected a vendor; what is the next step? Planning.

Planning between you and the vendor should develop a system suited to your needs and a schedule for installation of the system. Two areas which should be given special consideration in planning are equipment delivery and software.

One of the other major aspects of planning is parallel operation and conversion. The best approach is usually to phase applications into operation.

If you have an existing system, be it manual or automated, you should use the old and new together for a time until you are sure your staff is familiar with the new procedures and the new system is well checked out.

Typically, one to two months of parallel operation is sufficient. If you are on a manual operation, it may be difficult to have a parallel operation in some cases because you may be changing peoples' responsibilities so drastically that there is not time for them to carry out both responsibilities.

Now that you have completed your plans, the next step is to begin to carry them out. As you proceed with installation, have periodic reviews of progress so that you are aware of potential problems long before they become major problems. If you have the reviews, as you encounter situations such as Marks did, you are in a position to minimize the impact on your organization and the installation.

Was Marks a successful installation? Yes, it was. There were problems which occurred, but they were met and overcome with their impact minimized as much as possible.

Is the installation complete? Yes – but by no means static. As progressive retailers, the management has new ideas on systems for additional assistance or on enhancements to make the existing system more effective.

Allen is market development manager at Androcor, Inc., a retailing service bureau.

Development of POS Began 25 Years Ago

(Continued from Page 5)

POS devices.

Smaller chains and independents are closing their doors faster than new ones are opening.

Given this finite limit, there is only a certain number of suppliers who can remain in the market and make money. Furthermore, since the capital outlay to enter this market is large, we may expect that only the well-financed and well-established vendors will survive the race.

I expect the market can support only two or three major vendors and several smaller ones who may find their particular niche.

Shaffer is vice-president of Gambit Management Strategies, Inc., a retailing consultant firm.

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Improving man's effectiveness through electronics

POS Gives Liquor Store Owner Vacation Without Worry

Computers At Work In Retailing

BRONX, N.Y. – Better inventory control and a chance to take a vacation without worrying about what is happening to the store were only two of the reasons why Dominic Delicata installed point-of-sale (POS) equipment.

Price labels are coded and printed in the back office of Rite Liquors.

After New York State liquor laws were changed a few years ago to stimulate competition and legislate profit margins through price floors, Delicata's Rite Liquors here changed from a neighborhood store into a supermarket-type discount operation.

Since then, volume has climbed to over $1 million but, with business now a cost/plus proposition, volume has given way to turnover as a barometer of profit.

As a result, owner Delicata turned to electronic controls at the checkout counter and computerized inventory reporting.

The store works on a 2% to 3% net profit, so management depends on buying power to make money.

With an NCR 250 POS sales register at the checkout counter capturing detailed transaction data on a magnetic tape cassette and a nearby center to process the information automatically on an NCR 399 minicomputer, the store receives a weekly report that lists sales, inventory and profit for every brand in stock.

Rite Liquors installed its system last December, at the beginning of a busy season. "The urgency of the system justified the additional energy necessary to initiate it, even then," Delicata recalled.

The NCR 250 sales register, besides being linked to a magnetic tape cassette recorder, is equipped with an electronic wand that, when passed over a color bar code on the price label, automatically rings up the transaction.

A register check digit verifies the color bar coding, rejecting the transaction if it is incorrect. Local taxes are programmed into the register and added automatically to the sale price.

Rite Liquors handles 600 to 1,000 transactions per day. When traffic is particularly heavy, a second checkout counter and register are activated.

All transactions are recorded on cassettes which are removed from the recorder and brought to the computer center weekly, where they are processed in a short time, about one hour.

The information is brought up to date and an inventory and sales report is printed listing each item by group. The merchandise is identified and then broken out by size, bottles per case, open inventory by bottles and dollars, receipts and net sales by units and dollars, profits by sale dollars and inventory balance by units and dollars.

Thus, in a single weekly report, Delicata has all the information necessary to run the business. He uses it to make purchases, spot trends, plan promotions and monitor cash flow, among other things.

Price labels are printed and coded by a store clerk on an NCR machine in the back office. Working from a price book, the clerk indexes a four-digit code identifying brand, size and price into the keyboard.

Cashier at Rite Liquors passea electronic wand over color bar code on the price label stuck to the bottle to automatically record the transaction on POS gear.

The information is captured on the color bar and printed on the self-sticking label.

"Anyone can operate the system," Delicata said. "The cashiers and clerk who makes up the price labels were trained in a couple of days.

"The system is stable," he added, "and even though it was newly installed, we still were able to operate at the height of the season."

Delicata is convinced that electronic controls are the key to liquor store operations. "Anyone doing over $500,000 in sales should be able to afford sophisticated equipment for maximum inventory and cash control," he said.

Delicata also noted that every store is exposed to the public and subject to pilferage and shoplifting. Sometimes stock can also be pushed out of the way into the storeroom and inadvertantly forgotten.

"If there are no inventory controls, a store will not be aware of this until it's too late," he said.

As long as a store owner is willing to take the time to sort tickets and keep a perpetual inventory, there is no problem. But the owner of a store with an annual volume of $250,000 to $300,000 has approximately 2,000 tickets to correlate and enter into the sales book every week.

This is a cumbersome task and, if the owner is away for more than a week, it can be hard to catch up, Delicata noted.

For the small neighborhood store open 80 hours a week, POS equipment is the means for the owner to take time off without losing control of his business.

"The local store owner," Delicata said, "grows old with his store and wants more time for himself. Without equipment, he's vulnerable to disastrous results. The irony of it all is that the above can be achieved at an extremely negligible cost."

Systems network adaptability

If your business system involves tying your Model 742 terminals together in a complete communications network, TI offers the Model 700 TPS* Terminal Polling System.

Designed around the TI Model 960 Series minicomputer, the TPS automatically calls remote "Silent 700" data terminals, collects data stored on the magnetic tape cassettes, and logs the data on magnetic tape in a format readable by a host computer.

This scheme gives users a complete, cost-effective data capture network for distributive data processing and communications.

International Harvester dealers throughout the country use "Silent 700" programmable data terminals for quick, economical management of inventory and accounting data.

International Harvester found more . . .

International Harvester, which recently selected a large quantity of these models for use by its dealers for remote data entry and local processing in Service Parts Inventory Management and Dealer Accounting Data Services, has this to say:

"The TI terminal answers International Harvester's needs — simplicity of operation, nationwide service and the capacity to fill our dealers' requirements at a moderate price."

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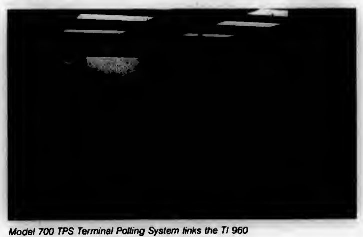

Model 700 TPS Terminal Polling System links the TI 960 Series minicomputer with "Silent 700" terminals for a complete data network.

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Suggests Warehouse-to-Door Shopping

Report Finds Technology Underused by Food Retailers

By Toni Wiseman
Of the CW Staff

Computers At Work In Retailing

CAMBRIDGE, Mass. – Although modern technology is being applied to some extent in the retail food business, its potential far exceeds its present utilization, according to a report issued by the Electronic Systems Laboratory at the Massachusetts Institute of Technology (MIT).

The last innovation in consumer procedures for food procurement occurred 40 or so years ago with the introduction of the self-service market featuring a large product line, the report said.

Advancements since then, it said, have been mainly in the form of bigger stores of the same basic format.

"Except for point-of-sale cash registers and their associated computers, very little use is being made of technology at the retail store level," the report said.

"Automatic materials-handling equipment, which is so highly developed and exploited in manufacturing, is essentially nonexistent in supermarkets and convenience stores."

Modern technologies such as computers, computer-controlled automatic materials-handling equipment and broadband communications make it possible to offer the consumer several options for food procurement, the report suggested, including highly automated warehouse-to-door shopping systems, retail superstores, automatic minimarkets and mobile, automatic markets.

Warehouse-to-door shopping operations have met with mixed success to date. Telemart, one of the earliest experiments, was unable to survive four years ago.

Two current ventures, Store-to-Door in Sacramento, Calif., and Call-a-Mart in Louisville, Ky., seem to be coping.

"Modern technology is in a good position to place warehouse-to-door shopping on a solid financial base," the report stated. "The present method of filling orders manually in existing systems appears to us as a costly procedure and one where technology can help.

"What is needed," the report said, "is an automatic, computer-controlled, single-unit order-selection system."

A future system should be one in which customer orders are entered directly into the computer by the customer, played back for customer verification, totaled for billing purposes and selected at the warehouse automatically in accordance with the data gathered, the report said.

Such a system remains to be developed because some of the technological problems still require resolution – the design of the automatic order-taking and order-selection equipment and the design of the home terminal from which orders are placed, the MIT group specified.

Automated Food Stores

For the automation of retail food stores, the MIT group suggested centering the shopping process on a computer-controlled automatic order-selection, collection and front-of-store delivery system.

Shoppers would view only samples or pictures of products on sale. Shopping booths might be installed in which orders could be checked off on standard order sheets and input through an optical scanner.

A catalog of items stored in a computer or on magnetic tape by product class and displayed on a television screen located in the booth would be another possibility.

Items chosen for purchase would be placed by positioning an electronically generated cursor opposite the desired item and depressing an "Order" key, the report said.

Other suggestions for automated stores included an updated, expanded version of vending machines, ranging from pay-as-you-go systems to intricate assemblies with conveyor belts and routing and payment systems centered around a multilevel, multiaisle vending machine.

"The key item required to achieve an automated electronic age of retail food shopping is a computer-controlled automatic order-selection machine capable of handling the 12,000 or so items of a conventional supermarket and of serving several hundred customers per hour with customer wait of a few minutes or less," that MIT group said.

"Our assessment of current technology indicates there are no fundamental inventions needed in order to achieve full-scale automated shopping systems. A new synthesis of existing technology from a complete system viewpoint is needed, however," it continued.

Alternative Shopping Systems

Other alternative shopping systems outlined in the report were automated minimarkets and mobile automated markets.

The minimarkets would serve as a complement to supermarkets, operating largely unattended and capable of handling somewhere between 100 and 300 different items.

In essence, these would be automated "Mom-and-Pop" or convenience-type stores, serving housing projects, residential subway stations and suburban areas.

The report emphasized that "to be successful, the automated minimarket must be a totally new design and not just a facelift of the so-called vending machine. The new system must be rugged, reliable, fast, convenient, eye-catching and pleasing to use."

Going one step further, the MIT group suggested mobilizing the minimarket with a 40-foot trailer that could visit several locations each day.

Such a mobile market would include a computer-controlled order-selection and billing system able to serve several customers simultaneously, a product line of several hundred items and a capability to operate with one driver/operator plus a helper.

This mobile shopping environment would be particularly beneficial for elderly people, mothers with small children and the handicapped, the report concluded.

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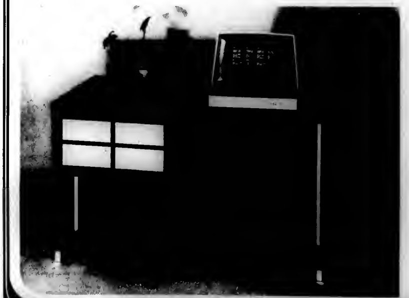

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Firm Takes Advantage of Union Between DP, Wats Lines

By Toni Wiseman
Of the CW Staff

NEW YORK – The marriage of computers and Wats lines has opened s new area of operations to retailers: direct marketing.

Computers At Work In Retailing

National Order Systems, Inc. (NOS), headquartered here, is one company which has taken advantage of that union. The company receives and processes phone orders and inquiries on behalf of other companies ranging from credit card companies to manufacturers, from book clubs and magazine publishers to record companies, from correspondence schools to financial institutions and from hotel chains to retail chains.

"Many retailers advertise in newspapers and magazines and have an order blank generally only for their own house charge or for cash," Larry Schwartz, NOS president said.

"Where they use a phone number, it is generally just a local number of their store and is available only from 9 a.m. to 5 p.m.

"Yet if you look at a Bloomingdale's or Gimbel's ad in the Sunday *N.Y. Times*, they have stores in Dallas, Chicago, Los Angeles, New York and Miami, and only the tiniest fraction of the readers of that ad can act upon it," he said.

By adding an 800 Wats line number to the ad, consumers anywhere can act at the moment of impulse – be it 2 a.m. or a holiday – and not have to look for scissors, envelope and stamp, Schwartz said.

"And by adding national or bank credit card options, the retailers not only extend their geographical area of impact but also their payment options," he stated.

One hundred and fifty operators, located in a geographically central electronic Wats line processing center in Omaha, Neb., answer National's 800 numbers 24 hours a day, seven days a week.

Each operator is seated at a keyboard-equipped CRT. When a call comes in, the operator keys in, for example, B for Bloomingdale's and the item number.

This triggers a computer response which appears on the CRT display in the form of all the questions necessary to fill that order.

Questions include name, address, city, state, Zip Code, house charge or credit card number and expiration date and full specifications on the particular product, such as size, color, quantity and style.

The operation relies on a turnkey system provided by Computer Consoles, Inc. of Rochester, N.Y. The system is composed of Computer Console CRTs and a 16K Varian minicomputer disk control unit.

The key to the operation, according to Computer Consoles' national marketing manager, Frank Quatro, is applying a mini to a maxi file application using large disks.

The computer, located in Kansas City, communicates with the CRTs via telephone and dedicated lines at speeds up to 9,600 bit/sec, he said.

At the end of each business day, the orders stored on disk are spilled out onto magnetic tapes on a Mohawk Data Systems data recorder. The information can then be transmitted over a telephone line to a similar data recorder at the retailer's fulfillment center. Or, if the retailer prefers, NOS will fly the tape to him the same night, Schwartz said.

If the retailer does not have an in-house computer system and uses sales slips, NOS' minicomputer system will print out the sales slips, which are then forwarded to the fulfillment center.

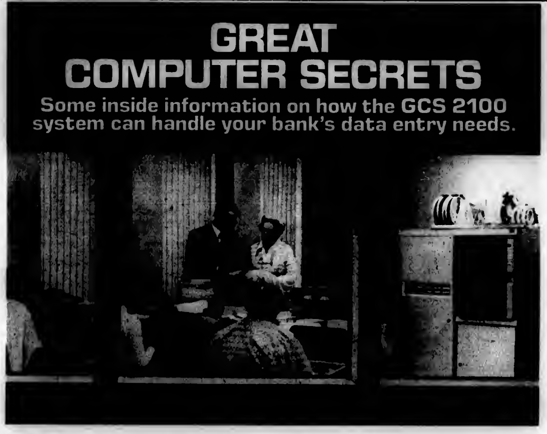
"Because we are able to receive the orders by computer and transmit them to the store the same day for shipment, we're able to process them even quicker than the store could, because very often they're only able to fill them out by hand," Schwartz said.

In addition to order taking, NOS provides associated services such as credit card approval, warehousing, billing, daily or weekly summaries of orders by source and list maintenance.

This service, Schwartz said, is designed to enable the retailer to make his retail advertising more effective and his order processing faster and more efficient as well as less costly. In addition, the system gives the retailer instant information retrieval for inventory control and reordering.

AUTOMATIC CHECK OUT
INTRODUCING POS POINT OF SALE SYSTEM USING UPC UNIVERSAL PRODUCT CODE
SUPER MART
GLUECKY

'You Little Bum – You Overcharged Me!'


GREAT COMPUTER SECRETS
Some inside information on how the GCS 2100 system can handle your bank's data entry needs.

One of the best kept secrets in the banking business is how efficient, reliable and economical the GCS 2100 multifunction, multimedia data entry system is.

(We've been so busy developing the system and its software support, we've never taken time to tell anyone about it.)

The truth is the GCS 2100 handles all major data entry needs including main bank processing, automated customer services, trust department transactions and charge card payments.

And does it very well. With substantial savings in time and personnel.

The system is so flexible (read powerful), there isn't room to list all its uses. Here are a few examples of the **primary** uses of the GCS 2100 system:

A $35 billion bank in New York uses it for demand deposit accounting.

They have four GCS 2100 systems—two for random batch transmissions—payroll, billing, installment and commercial loans etc.—two for DDA. The latter systems handle over $5 billion worth of checks every night—checks the micro-encoding system cannot handle.

A $275 million bank in Seattle uses it for charge card transactions.

They estimate that first year cost savings since they installed their GCS 2100 system will be $50,000.

A $7 billion bank in Boston uses it for payroll.

They use their GCS 2100 system to process more than 40,000 payroll transactions a week for over 400 corporate customers. With a substantial savings over their former keypunch operation.

A $1 billion bank in Louisville uses it for trust account maintenance.

They use their GCS 2100 system to handle buys and sells, changes in principal, income and securities holdings. In addition to improved departmental control, increased security, throughput and quality of data, they reduced their trust data entry staff by 33%.

Whatever size **your** bank is, or whether you are using key punch or key-to-disc, the GCS 2100 system can offer these same kinds of efficiencies, economies and increased capabilities.

For more information on how the GCS 2100 system can help **your** bank, contact your local representative or Tom O'Brien, Director of Domestic Sales at General Computer Systems, Inc., 16600 Dooley Road, Addison, Texas 75001. Call (800) 527-2568/9 toll free or (214) 233-5800 within Texas.

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BEEMAK PLASTICS

Editorial

Love in Bloom

IBM and AT&T are openly courting each other again, and both users and vendors are watching and wondering.

IBM has told the Federal Communications Commission (FCC) the AT&T method of interconnection was really not all that bad and the Bell System should be allowed to administer a liberalized version to simplify the use of noncarrier equipment [CW, Aug. 6].

The IBM position agreeing with AT&T was surprising in several respects. To support a Bell-administered interconnection plan, IBM had to take a position totally different from that of the Computer and Business Equipment Manufacturers Association (Cbema), of which it is a key member. Cbema said it favored an FCC-administered interconnection certification plan.

But IBM support for AT&T followed a Bell statement of last year in which Bell said it really didn't see any problem if IBM were to launch its own satellite. The fact that IBM might be in direct competition with an AT&T satellite did not seem to bother Ma Bell.

The love affair between the two industry giants has been smoldering for many years. Although IBM makes modems, its salesmen rarely object when a DP customer wants Bell modems.

And, in the terminal area, IBM has always neatly avoided producing terminals that do exactly what Bell teletypewriters do for the same money.

The introduction of the Bell Dataspeed 40 CRT has been a departure. But, despite secret Teletype Corp. documents, Bell has yet to introduce a display terminal that operates on binary synchronous lines — the way IBM units do.

In the PBX area, IBM has for years dragged its feet in introducing the 2750 and 3750 computerized PBXs into this country.

Bell, meanwhile, is introducing switchboards that look more and more like computer switches.

There is, of course, no proof the two giants purposely sidestep each others' areas to avoid direct confrontations. Both companies certainly have the means to compete if they put their minds to it.

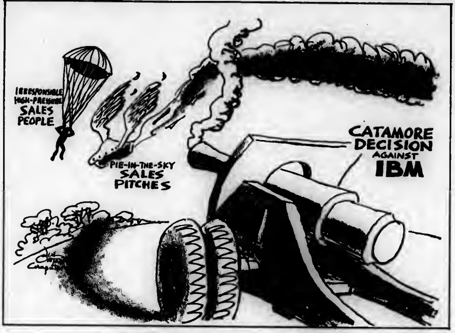
Many industry experts can understand AT&T motives in pushing for detente with IBM. They point out that IBM makes higher profits, has more agressive marketing and is better managed.

These experts feel AT&T would be crazy to attack IBM head-on in any area. Why IBM favors Ma Bell is more of a mystery.

Nevertheless, the romance seems to be in full flower at the moment. If the romance continues to develop, maybe we'll see AT&T appearing as a character witness in the IBM antitrust suit to state what a marvelous, unassuming company IBM really is.

If that happens, IBM will of course reciprocate with an appearance at the upcoming AT&T antitrust trial to assure the court that Ma Bell is really a grand old gal.

Isn't love wonderful?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PIE-IN-THE-SKY SALES PITCHES
CATAMORE DECISION AGAINST IBM

Letters to the Editor

Negative Label of 'Headhunter' Unfair to Ethical Professionals

The word "headhunters" in the article concerning Xerox's departure from the computer mainframe business [CW, July 30] connotes a very negative and mercenary attitude.

Some organizations in the job-search field deserve to be categorized as such. However, there are many ethical and above-board organizations that do not fall into this category.

We are professionals in our field and are closely governed by the State Bureau of Employment Agencies. It is unfair to those of us who try to practice our profession ethically to be branded by such negative labels.

Noel Smith

Computer Careers, Inc.
Long Beach, Calif.

Elimination of Price Marking Results in Consumer Benefits

The editorial, "Marking the Price" [CW, July 23], missed a very important point on the advantages to the consumer of scanning checkout systems in supermarkets.

The largest single expense in a supermarket is labor, and price marking each item represents a significant portion of that expense. Elimination of price marking reduces expenses, and competition will force the retailer to pass this reduction on to the consumer in the form of lower prices.

Though the letters to the Senate Commerce Committee do not express anticomputer feelings, they imply general suspicion and distrust of automation and the retailers.

Scanning systems and shelf pricing provide more information to the consumers than was ever before possible. Scanning of Universal Product Code (UPC) symbols offers better control over pricing and reduction of pricing errors.

The objectives of any well-run business are to competitively price through reduced cost and improved productivity. Price marking is an opposing force to these objectives and can only result in higher prices to the consumer. Scanning systems offer an opportunity for the retailer to achieve these objectives.

Why not let the consumer save even more money by eliminating pricing?

W.L. McNamar

Los Angeles, Calif.

Customers Should Decide Issue

For a *Computerworld* editorial to say "supermarkets should leave the prices on all items" [CW, July 25] is most disappointing indeed.

Instead of joining the ranks of arbitrary rule makers, CW should be calling for faith in freedom to solve the thorny technical-economic trade-offs our industry increasingly faces.

Let one supermarket drop its price markings and then see if the consumer still freely chooses to shop there. There can be no better way of determining whether the extra cost of price marking indeed contributes to society's well being.

Donald H. Bein

Milwaukee, Wis.

Use of Cartoon Ironic

I found it ironic that, in the same issue where you ran two articles on discrimination against women in DP, you would run a cartoon showing the typical male view of women. I refer to the July 23 issue and the cartoon on page 14.

Judy Lucy

Somerville, N.J.

Conclusions Unjustified by Sample

"Majority of Women DPers Find No Job Discrimination"? The headline for the July 23 front-page article is inappropriate, misleading, dishonest and unprofessional.

The article's meagre sampling of 30 subjects does not justify generalizations like "majority of women DPers," especially when the majority equals 18.

Kathleen Barry Albertini

Washington, D.C.

Statistical Results Questionable

The article on the results of *Computerworld's* survey on discrimination against women in the DP area was irresponsible. Not only were the statistical results questionable but the reporting of these statistics was incomplete.

The story provided no information to substantiate the results as being statistically significant. The sample size was small, especially considering the diverse categories within the DP field. This made the results even less significant.

Furthermore, there was no explanation of the geographical distribution of the survey participants, nor of their representation of their total population.

We object to the conclusions drawn as reported in the lead paragraph. In particular, the use of the highly loaded word "majority," in both the headline and lead paragraph, implied a far greater degree of consensus than the results of the survey indicated.

D.M. Becker
L.O. Cole
D.A. Greene
Y.M. Landsmann
C.A. Neuman

Bell Laboratories
Naperville, Ill.

(Other letters on Page 14.)

Letters to the Editor

PL/I Not Ambiguous

Having followed the PL/I American National Standards Institute (Ansi) standards activities for the past few years, I resd Eric A. Weiss' comments [CW, July 16] on BSR X 3.53, Basis/1-12 with interest.

I feel his letter on standards philosophy and its application to BSR X 3.53 was incomplete. To whom should a standard be understandable and precise? Above all to the implementor – with the user a close second.

One of the methods, to be sure, that was deliberately chosen to address the implementor was a metalanguage definition to remove ambiguity and inject preciseness.

The issue, it seems, is the appropriate standard for couching programming language standards so the integrity of implementations, as viewed by the user community, is both maintained and controlled in high degree.

Committee X3J1 has exerted much effort at defining an implementation standard for a powerful language. It has also advanced a significant contribution to DP on the methodology of language implementation documentation.

Weiss' comments, through lack of evidence and argument, addressed neither of the X3J1 contributions with respect to past Ansi standards documents or future directions to which the methodology should be trending.

T.M. O'Leary
Lisle, Ill.

Complexity Necessary

The purpose of a standard is to serve as a guide for implementors and as a final arbiter of interpretation, not as an everyday reference guide.

No one will dispute Weiss' contention that the standard is a complete and abstract document. This is as it must be. The proposed standard directly addresses the problem of defining all possible standard PL/I programs and attempts to fully characterize their outputs. The use of an algorithmic and mathematical approach to the problem is both natural and necessary.

Ours is an intrinsically mathematical profession. It disturbs me when people are unwilling to accept that fact. We should not fear a few unfamiliar notations and hoary abstractions.

Dennis R. Allison
Menlo Park, Calif.

How to Help

None of us, spectators or prospects or customers or employees or stockholders, can do anything about the Xerox decision to finally abandon the central processor business. It's two, perhaps three years too late for that; somewhere around the time when the parent corporation began to treat its expensive acquisition as just another part of the enterprise, one could write the obituary and order the casket. For me personally, the telling symptom was when the unfortunate company hired Myron Tribus away from Commerce: any effort that wrong-headed *had* to be doomed, wealthy or not!

But there is one major, economically valuable, socially desirable thing some of us can do. There will now be entering the job market more than a thousand trained, loyal, competent people: salesmen, problem analysts, systems and applications programmers, hardware and firmware designers and probably some maintenance engineers. Additionally there will be secretaries and data entry personnel and clerks, who while not full professionals have valuable familiarity with the computing and data processing business.

For those of you who already have or are receiving Xerox machines, every one of these classes except the hardware designers can help, and even there users planning major data communications ventures can utilize such capabilities. For readers who have competitive equipment, especially IBM, which XDS employees had to be very familiar with, the analysts and programmers and the subprofessionals offer real payoffs. And for Burroughs and Univac and Digital especially, and for smaller competitors and suppliers in general, the salesmen and designers offer fresh insights and a burning desire for revenge!

I hope every reader who is in a management slot, and many more who are primarily technical but who know of the opportunities inside their own shops and nearby, will make a conscious effort to recruit some of these men and women. Only by keeping as many as possible in valuable jobs within the information community, rather than letting them depart in disgust for real estate and Colonel Sanders and – ultimate horror – IBM, can we hope to bolster the user and the supplier communities for the fiercer battles that lie just ahead.

Herb Grosch

Standard DP Contracts Not Inviolable After Signing

(This series is a result of discussions between Alan Taylor and some lawyers on Taylor Report readers' complaints about current standard computer contracts.

In the first part of the series [CW, July 30], four circumstances in which standard computer contracts might be set aside were listed. Three were based on the concept that there had been no true "meeting of the minds" when the contract was entered into because important data was wrongly stated; essential data available to the vendor was not revealed to the buyer; or the vendor had no intention of carrying out the promises made to the buyer.

The fourth category was based on dangers involved in the proposed computerization which the vendor did not reveal to the buyer before the contract was signed. Such concealment of dangers can result in the vendor being held responsible for subsequent problems.)

The Taylor Report
By
Alan Taylor, CDP

The life cycle of a computer purchase proceeds through three major phases – procurement, which starts with the gathering of various proposals and ends with the signing of the contract; implementation, which starts after the contract is signed and ends when the operations are all working; and usage, which is the productive use of the operations.

Because of the characteristics of computers and computer software in particular, there are many places in each of these three areas in which vendor action may eventually result in the voiding of the vendor contract.

Because of the time that can elapse between the occurrence of such events and discovery by the user that something wrong has occurred, memories can grow dim unless the user watches and notes what is happening while it happens.

Let's talk about some of the important events that can occur during each of the phases of the computer life cycle.

Procurement Events

The facts stated in the vendor's proposal and provided by brochures and seminars can, if wrong or inadequate, result in the voiding of the contract.

This is not restricted to statements regarding the actual hardware or software the vendor is offering, but also includes the services the vendor will make available to the user, the costs to be expected at various stages, the quality of both user and vendor personnel, etc.

For instance, an incorrect vendor statement regarding the availability of a competent support team – for either hardware or software – may be sufficient to void a contract even though there is no mention of such support in the contract itself. This is based upon the legal concept that contract acceptance could have been improperly obtained through the provision of false information to the prospect upon which he relied when making his decision to sign up.

Another area which can later result in the voiding of a contract is the omission of danger warnings which the vendor has an obligation to give to the prospect.

My experience is that only a very few current proposals address in depth the dangers that may exist, and most do not even mention it. In such cases, if it later develops there were dangers implicit in the computerization project of which the prospect did not know and which the vendor did know (or should have), the subsequent legal situation can be undermined.

Implementation Events

Once the procurement stage has been completed, it cannot be reopened. What has been done is done – and what has not been done remains forever undone. Nothing that happens after the printed contract is signed is directly counted as happening beforehand.

However, some events may occur during implementation which may appear to alter what happened prior to the signing of the contract – a disk may be added, changing the configuration requirements, or additional staff may be required beyond the original specifications.

These decisions are implemented by the user, so they cannot affect the validity of the original contract, right?

Well, not quite right. These changes can point to earlier, precontract vendor failures. For instance, if the vendor claims during the implementation period additional tapes are needed because of some newly defined report request, and if, in fact, the tapes were needed for the original system but were left out of the proposed configuration, then this fact could help indicate the vendor does not intend to live up to the original contract and is engaged in a sort of bait-and-switch operation.

The exact circumstances of any change during the implementation period are often unclear, but the basic responsibility of the vendor to behave openly and honestly with the buyer continues.

Using this period to cover up prior false or misleading statements or bring in notices of new "requirements" can, in conjunction with prior assurances or omissions of necessary warnings during the procurement phase, be easily regarded as indicating both the faults that occurred in the procurement phase *and* the vendor's knowledge of these faults, rather than as indicating the vendor's absolution from his contractual and other duties because of the buyer's intervention.

Changes during the implementation phase, however, are fraught with dangers to the buyer as well. Users should realize the potential such changes have of losing buyer rights. They should not, therefore, just sign vendor-prepared letters as routine, unimportant documents because they may be very important ones!

Usage Periods

The period when a buyer can really test the validity of the original contract comes during the use of the system, rather than during the implementation period – no matter how long implementation takes.

Many things can happen during a system's use which the user simply had no reason to expect. A user may find that some report is not available when he is expecting it – or that sometimes it is simply not available at all. He may find a report includes inaccurate information. The downtime of the system may be unexpectedly high, or the maintenance may be much more expensive than originally expected.

Any of these items can give the user a right to compare what is actually happening with the accuracy of the statements made by the vendor during the procurement period. He can also question the accuracy of statements, made during miniprocurement periods, which have led to various changes whose effects can now be seen.

Computers and software being what they are, this questioning may not be able to take place for months or even years after the procurement period has ended, but this doesn't erode a buyer's right to have an improper contract put aside.

Effectively then, vendor statements made or not made during the procurement period can be of major importance years later because they can govern the validity of a computer contract entered into as a result of such statements.

The fact that a contract doesn't, say, provide for a user's right to recover damages because of unexpected and costly downtime does not automatically mean the vendor can escape liability. The contract itself, if it doesn't contain adequste warning of such a possibility and of the dangera resulting from downtime, can be null.

Which leaves us with the next question – What are the financial implications of contract nullification? These are also covered by various legal principles and will be discussed in the next part of this series.

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Ontario.

Letters to the Editor

Why Should Programmer Take Rap for Mistake?

Jerry Matlin is clearly not an experienced airline passenger [Taylor Report, CW, July 16]. If he were, he would know all he had to say was: "I would like to cancel my flight from Raleigh to Norfolk, but please do not cancel the following legs on my ticket."

Both Taylor and Matlin are making too big a deal of his mishap. Why should the computer and its programmers take the entire rap, leaving the passenger with no obligation to make clear his desires?

T.M. Stout
Woodland Hills, Calif.

Taylor Approach Backwards

I sincerely hope it is not a reflection on the DP community that no one pointed out Alan Taylor's totally backward approach to solving the 2LB 3OZ "Gigo error" [CW, June 18, July 2]. I hesitate to use the word "incredible" because it connotes goodness, but I must. I find it absolutely incredible Taylor can use up almost half a page and totally avoid the true solution.

This is doubly incredible in view of his past articles on forms (hospital bills, etc.) misdesign.

The correct and undeniable obvious solution is simply that the "3" and the "OZ" should never have been placed directly adjacent to each other in the first place.

A space should always be placed between a measurement and its units.

Thus, the basic problem is one of very poor forms design, and Taylor should spend his time looking for the right solution, rather than trying to find the most complex one to fill his allotted space.

Michael D. Brown
Hanover, Pa.

Real Culprit Overlooked

Alan Taylor and the letter writers were not observant enough to see the real cause of the problem cited in Taylor's column of July 2.

The printout does not say "three zero zee." It says "three oh zee," which can be verified by inspecting the other "ohs" and "zees" in the illustration.

The program's symbol for ounce, therefore, must be "Z," rather than "OZ."

The real culprit here is an overforgiving routine which will accept either "oh" or zero for zero.

I have found from experience there is a practical limit to the garbage a program should try to rectify. In most cases, the proper procedure is for the program to just reject the input and require it to be entered correctly.

Elliott F. Gussow
Indianapolis, Ind.

Datacrown Does Processing

The article on Bristol Myers Products Canada having taken a "distributed processing" approach ["Distributed System Saves," CW, June 25], was most thorough, but might have left the impression central processing is done on an in-house computer.

In fact, the processing is done by Datacrown Ltd. on one of our two IBM 370/168s at our suburban Toronto data center.

David M. Carlisle
Vice-President of Marketing
Datacrown Ltd.
Willowdale, Ontario

System Maintained Easily

I would like to respond to comments in the article, "Rules Not Helpful All the Time" in the June 4 issue, attributed to Peter J. Denning on the use of structured programming on The New York Times Information Bank Project. He stated that "it had more bugs than at first admitted" and that it was "extremely hard to fix and complete."

The published documentation on the quality of the information bank software covers the period when IBM was responsible for its maintenance.

Each detected error was recorded, analyzed and included in the summaries, which are complete and accurate for the entire 16-month period covering acceptance testing and initial system operation.

When delivered, the system was fully operational and satisfied all requirements contained in three volumes of functional specifications.

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Thus, while I have no knowledge of the difficulty of correcting errors which may have been discovered after the period of IBM maintenance, our experience was that it was quite easily maintained.

F.T. Baker
Chief Programmer
Information Bank Project
Rockville, Md.

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Danish Center Demands Very Early User Commitments

By Julia Van Duyn
Special to Computerworld

COPENHAGEN – Perhaps the most significant difference between U.S. and Denmark DP facilities operations is the distinct role of the user.

"Since the user has a big stake in the project, he's responsible for the system and its administration," Mogens Arentzen, head of education and training at Datacentralen, the largest DP center in Denmark, said.

"He is obliged to participate in the project from the time he accepts and signs our proposal – and even before. In fact, a project does not go into production until and unless the results of the final tests are approved in writing by the user," Arentzen said.

Jon Mikkelsen, manager of the R&D division, concurred: "By fully involving the user in his project, we are able to solve his problems faster, as well as solve the so-called 'user problem.' "

The user's involvement starts when the systems analysts define his problems. It continues through the system requirements, system design and programming specifications phases.

Further, the programmers do not start coding until the user approves the programming approach.

After the programming phase is completed, the user is obliged to deliver small, representative data material on which the system can be tested. This is followed by additional testing – including parallel runs – with more extensive data provided by the user, until the system is found acceptable by the user, who then signs off on it.

Salaries, Costs High

Salaries of DP professionals in Denmark are higher than in the U.S.

Systems analysts' salaries range from $15,000 to $25,000 per year; programmers' from $13,000 to $20,000 per year; operations people from $12,000 to $18,000 per year.

The cost of living, however, is twice as high as in the U.S., the author found during a recent tour of Scandinavia.

Moreover, it is the user's responsibility to have his source documents at the DP center at the defined time. If the material is not delivered on time, the Datacentralen "has no obligation to deliver the finished product at the agreed-upon date. That is, the final product/output is delivered to the user as soon as circumstances will permit," Mikkelsen said.

Wide Choice for User

The user, however, has a wide choice of input media. The Datacentralen processes a variety of input media, such as paper tapes, cassettes, hard copy, remote job entry, magnetic tape and punched cards. But its standards on the format and quality of the delivered source material are very exact.

If the material cannot directly enter the data center's equipment, the staff corrects the defects, possibly via special processing. In such cases the delivery of the user's material is not considered "officially" delivered until the defects have been remedied, and correspondingly the user receives the output that much later.

The Datacentralen's more than 900 employees work in large, modern buildings, with security strictly enforced. At the main location in Valby, the hardware consists of two 2M-byte OS/MVT IBM 370/158s and one 1M-byte 370/145.

The latter is a backup system and is also used by R&D to test VS, IMS, TSO-ITF, etc. At another location, Datacentralen has two 1.5M-byte OS/MVT 370/158s.

At Valby there are also two Danish Regnecentralen (RC) minicomputers, 40 IBM 3330 disk drives, 25 9-track magnetic tape drives and some 100 Stansaab CRT intelligent terminals that are IBM 3270-compatible. The I/O devices consist of OCR, key-to-disk and an RC3600 that converts tape to print, card to tape, paper tape to magnetic tape and cassette tape to magnetic tape.

Here, as well at the other large DP centers in Scandinavia, Cobol is the primary programming language. But PL/1, RPG and Assembly language are also used.

Division Responsibilities Differ

The Datacentralen's organizational structure, with management, planning, programming, operation and R&D divisions, is similar to that in the U.S. However, the responsibilities of these sections differ somewhat.

The planning division, staffed with 200 systems analysts, interfaces with the users, defines problems, establishes system requirements and writes proposals outlining "systems solutions."

Subsequently, a steering committee comprised of one person from each of the divisions plus the user run systems tests. Then, when the user signs the proposal/contract, the planners design the proposed system and write the programming specifications. The project then is handed over to the programmers.

The programming division employs 200 programmers of all levels. When the programmers are finished with their part of the project – and before the system is given to the operation division – the steering committee runs final tests. It is at this point that the user approves the system in writing, or the project does not go into production.

The operation division, consisting of 300 employees, is responsible for the running of the production-ready project.

The R&D division staffed with 50 professionals of various disciplines, does the evaluating, buying, implementing and reviewing of hardware and software.

This division is responsible for the development and establishment of standard software and long-range planning for the entire DP center.

The R&D staff also provides instructors in training employees and users in new systems, such as a staff-developed teleprocessing monitor system and a data-independent, standardized file handler system.

Its efforts also include experimenting with new methodologies – documentation and flowcharting techniques – to make programming easier.

The Datacentralen management, with all of its impressive advanded tech-

(Continued on Page 16)

IBM On-Line Payroll Uses Two 3270s

WHITE PLAINS, N.Y. – The On-line Payroll and Personnel System (Opps), recently introduced as an installed user program (IUP) from IBM, provides 370 installations with CRT-based access to employee records.

Batch programs for backup, recovery and report generation are included in the package, a spokesman noted.

Opps supports the operation of two IBM 3270 information display systems linked to a 370 running under both DOS/VS and CICS/VS. As currently written, it works with 3330-type disks, but the CICS device table can be changed to accept other units.

Working with a 3270, a payroll clerk can enter changes in salary, stock purchase deductions, awards received, charitable contributions and hours worked.

The user may also retrieve data, including – for example – current pay period or year-to-date totals on an employee or totals for a department or the entire user organization.

Opps as currently written calculates withholdings for only a single tax jurisdiction. Since the calculation routine is table-driven, however, factors can be changed and more jurisdictions covered quite easily, IBM said.

Opps can prepare payroll checks on a weekly, bimonthly or monthly basis, generate federal reporting forms (including both 941As and W-2s), and produce management summaries, IBM said.

As a by-product, it can also produce mailing labels for all or selected groups of employees at their departments or home addresses, the spokesman noted.

Data security is keyed to operator identification numbers that define what portion of the base the individual may access. In addition, the system maintains a log of every transaction, including operator and terminal numbers and the time the transaction occurred.

Developed by the First National Bank of Maryland in Baltimore, this IUP requires up to 150K of memory. Cobol source code is available under license for $780/mo, which is waived after 12 consecutive monthly payments.

As an IUP, it is "distributed on an 'as is' basis, without warranty . . . successful implementation . . . depends solely on the customer's ability [and] his acceptance of full maintenance responsibility . . . no assurance of successful installation can be given," according to a warning on the IBM pamphlet describing the program.

V70s Gaining Fortran G, Cobol

IRVINE, Calif. – Both Fortran "conforming to IBM's level 'G' " and Cobol that "exceeds Navy requirements for minicomputers" are being added to the language processors available on Varian V/70 series systems, according to the company.

The Fortran is available now for use under either Vortex or Vortex II environments. First deliveries of the Cobol compiler (for Vortex II only) are expected in January, Varian said.

Varian's Fortran is said to have "significant extensions" beyond the American National Standard Institute requirements for the language.

Support for double precision integers, direct access I/O statements, generalized subscripts, encode and decode statements and arrays with up to seven dimensions and among the extensions.

Fortran is being furnished free to users of V71, V72, V73, V74 or V75 systems.

The forthcoming Cobol compiler is intended to give users capabilities that conform to ANS Cobol '74 Level 1 plus extensions. For potential U.S. Government users, Varian noted, the processor will comply with the National Bureau of Standards definition of Cobol at the low-intermediate level.

The Cobol requires a Vortex II system with the V75 instruction set and 48K of main memory; it will be available, however, on any of the V70 series except the V71 and will cost $5,000.

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DOS/VS Uses VM/370 and CMS, Makes DOS Features Interactive

NEW YORK – IBM DOS/VS users can create, develop, execute and debug programs in a conversational, time-sharing environment by utilizing IBM's Virtual Machine facility (VM/370) and Standard Data Corp.'s Interactive DOS (Idos/VS).

VM/370 manages a real computing system so multiple operating systems can execute concurrently; each is said to run in a virtual machine. OS and DOS, as well as their VS versions, can be used in any of these virtual machines.

In addition to the conventional operating systems, however, VM/370 also permits the use of the IBM-supplied Conversational Monitor System (CMS), a time-sharing system controlled by the user from a remote terminal. Idos/VS is an extension of CMS, Standard said.

CMS provides the user with a general-purpose, time-sharing facility suitable for program development and execution. Idos/VS extends that environment to provide functions and features which are available on a DOS/VS system, but not normally on CMS.

CMS, as distributed by IBM, does not include Isam, Vsam, Sort/Merge and read/write access to DOS data set supports. Nor, according to Standard, does it support DOS/VS language processors.

Idos/VS, however, supports all of these facilities as would a "native" DOS/VS system – Idos/VS uses actual DOS/VS logic, not a simulation, the independent vendor noted.

Users can work in either batch or interactive mode for execution of programs under Idos/VS. The batch approach utilizes standard DOS/VS job control to handle program execution.

The interactive mode allows the user to perform single DOS job steps, such as loading and executing DOS programs and modules, link editing or assigning peripheral devices.

Idos/VS requires no modification of VM/370 or CMS for installation. It consists of its own supervisor tailored to run with CMS, but even to CMS, Idos is transparent.

The monitor assumes an application program is executing when Idos/VS is active, Standard said.

Idos/VS can be installed in less than a day, the vendor claimed. It costs $15,000, but monthly lease plans are available, a spokesman said from 1540 Broadway, 10036.

$680 Package Watches Tapes

ATHENS, Ga. – The Magnetic Tape Library System now available from the Computer Software Management and Information Center (Cosmic) is a series of programs for monitoring tape utilization at an IBM 360/370 installation.

Input consists of a library master file, a date control card and transaction cards.

The date control card contains the run date as well as fields used in selecting reports to be printed. The transaction cards contain one of seven codes to designate what action is to be taken with the data on the remainder of the card.

Incoming transactions are verified and edited, then processed against the master file. Generated output consists of an updated master file, control reports and a report file.

Nine reports are available to the user, Cosmic noted. Three of the reports are for control and are printed on-line.

The remaining reports – Assigned Tape Listing by Employee, Unassigned tape listing, Tape Release Schedule, Tape Release Schedule (Final Notice), Assigned Tape Listing by Tape and Tape Assigned Summary by Individual – are user reports printed off-line by an OS/Slave print program that is also part of the system.

Developed at Ames Research Center and cataloged at Cosmic as ARC-10942, the programs are written in ANS Cobol and include "approximately 1,800" source statements.

The coding is available for $680; the documentation carries a separate charge of $8.

Cosmic is at 112 Barrow Hall, University of Georgia, here in Athens, 30602.

Danish Users Okay Test Results . . .

(Continued from Page 15)

niques – 99% uptime on the teleprocessing system and 97% to 98% uptime with the mainframes – still have to grope with the universal problem: inferior software.

"Much effort is put into the improvement of the software that we buy." And "since in general, the people cost is double the machine cost, our main concern is to upgrade our staff's knowledge, efficiency, and competence through new methodologies and in-house courses and training and outside school curriculum."

Though the majority of its users are government departments, and only about 5% are private businesses, the Datacentralen – officially classified as a nonprofit organization – is not run as a government agency but as a commercial enterprise. It is definitely result-oriented.

Moreover, none of the users – government or private businesses – are obliged to give work to the Datacentralen. This center competes with commercial service centers and, in fact, the IBM data center in Copenhagen is one of Datacentralen's biggest competitors.

'But we believe that we are good," Arentzen said modestly, "and that's why we think we have so many customers."

Van Duyn is a national lecturer with the Association for Computing Machinery (ACM), consultant and author of Practical Systems and Procedures Manual, Reston Publishing Co., 1975.

. . . and Get Complex Systems

Special to Computerworld

COPENHAGEN – One of the more interesting applications – aside from the usual commercial systems – that have been designed, developed and maintained at the Datacentralen is the Central Population Register (CPR), a batch processing system which is in the process of being converted into a data base that can be accessed directly from terminals.

The CPR includes all persons who live in Denmark. Each person in the CPR is assigned a unique "person number" and his present address is maintained. Thus, the CPR is used as a basis for statistics. The input is provided by six municipal DP centers.

Another major Datacentralen project has been development and maintenance of the Central Register for Motor Vehicles, which is run both in batch and teleprocessing mode. CRT display terminals are used for 6,000 transactions entered daily.

In addition to such output as registration certificates for the owners of motor vehicles, tax bills (based on weight, fuel used and use of the vehicle) and reports of periodic inspections, the system also notifies each individual motor vehicle office if its supply of any of 18 different series of license plates is getting low. In other words, this system is also an inventory control system for the license plates.

The teleprocessing system is primarily a retrieval system. Inqiuiries are made via CRT and Telex terminals from the motor vehicle bureaus and police offices anywhere in Denmark. Security is well guarded, and only authorized persons have the identification number to access information in the files.

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APL-Based Financial Models Aid Business, Academia

J. Daniel Couger On Education

The subject of financial planning models is one area of strong mutual interest between academia and business today. Until recently, only rudimentary level computer-based financial planning models were available for widespread use. Now some very good models can be acquired for an in-house computer or accessed through a time-sharing service.

Although models are being developed in several languages, a number of APL-oriented financial planning models have emerged in a surprisingly short time.

The file access capability IBM recently added to APL is a major factor in this development.

At Sun Life Assurance Co. in Montreal, actuary Jacques Deschenes estimated that, without APL, it would have taken up to five years to develop a model equivalent to the one his company developed in two months.

"Some people figure because the corporate model was put together so quickly, it is very crude and simple. It is not," Deschenes said.

"For example, if we need to alter all the figures for the next five years because one postulate was changed, we can do this in about 10 seconds using APL. Because it is done so quickly, it doesn't mean that it is a simple operation. It is an extremely complex calculation which demonstrates the power of the language.

"Top management is aware of the potentialities of APL," Deschenes added. "Today questions can be answered which management would never have even bothered to ask before because it knew it would be too much trouble."

Financial planning models can now be acquired through the mainframe vendors (e.g., IBM for $345/mo for first year only). Also, several national time-sharing services provide access to models (e.g., Scientific Time Sharing Corp. [STSC] for $400/mo plus $10/hour and 6 cents per CPU unit utilized).

The APL Financial Planning System [an IBM field-developed program (FDP)] lets the financial analyst and planner design reports, specify calculation statements, enter and change data and obtain printed reports with immediate turnaround.

These capabilities are interactive and easy to use. The system prompts the user, permits request for guidance and helps in the design and layout of reports. Multiple data bases can be created, duplicated and compared and may contain annual, quarterly or monthly figures.

Output is available from the terminal or the high-speed printer. A large set of financial, arithmetic and forecasting routines is included. These routines perform the kinds of calculations normally required in planning and budgeting.

The APL Financial Planning System does not include any predefined line items, but rather provides a framework which is used to create a planning model. A text-editing system and a simplified, English-like planning language eases this effort.

The appearance of the reports can easily be altered even after the model has been created.

With the system:

- The beginning user is guided through the steps of setting up the planning model and defining the layout of the reports.
- Logic statements are in an English-like language that is easy to use and understand. Invalid syntax is detected immediately as it is entered, and an explanation of the error is printed at the terminal.
- Data entry incorporates an inquiry facility which ensures the line items of input data match the verbal description.
- The text-edit program eases the task of creating the verbal portion of the reports. Lines appearing on the report can be rearranged, added, deleted and changed. Text editing is facilitated by a "text look-up" feature that searches for words or characters.
- Calculation routines include depreciation, interest on a loan, yield, cost of production, growth rates, source and use of funds and lease payments; forecasting routines are available for exponential and linear projections based on a least-squares regression, data points and other methods. About 50 routines are included.
- The user may also provide specialized routines for convenience or additional function. In addition, APL code may be included within the logic statements.
- A "quick" report or plot may be generated from predefined text and data.
- A data base is easily duplicated and the time span may be changed. A variance data base may be created which shows the difference, item by item, between two other data bases.

Paul Tava, planning specialist at STSC, reported that applications of the Financial Planning System (which STSC developed some time before IBM announced its FDP last December) range from simple budget revisions to a 10-year plan, such as that developed by the Upjohn Co.

"The typical user characterizes himself as a nonprogrammer and usually has little or no experience with time-sharing," according to Tava. "A person can become proficient in use of the system in 40 hours and an expert by the end of the second month."

The addition of the National Bureau of Economic Research data base, with 3,000 time series, has enhanced the STSC service.

My students utilized the STSC model during the spring term and for a term project. The availability of the statistical library and the forecast generators enables the user to produce some sophisticated analysis.

After personal use of the STSC system, I'm impressed with its versatility and ease of access. The manual is comprehensive (202 pages), costs $10 and is an excellent reference. For a copy, write for *Financial Planning System*, Common Library 701 User's Guide, STSC, 7316 Wisconsin Ave., Bethesda, Md. 20014.

The Sun Life application is described in Vol. 2, No. 3, 1972, pages 8-11 of *Data Processor*, IBM Canada, 1150 Englington Ave. East, Don Mills 403, Ontario.

Contact IBM for the manual on IBM's APL Financial Planning System.

Couger is professor of computer and management science at the University of Colorado.

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DAA On Its Way Out — But Nobody Sure How Soon

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – It may still be some time before data communications users are able to return their Data Access Arrangements (DAA) to the telephone company.

Although the Federal Communications Commission (FCC) has attached high priority to an alternate interconnection method, several regulatory roadblocks must be eliminated before a final decision can be made.

This is the opinion of several regulatory experts in the wake of responses requested by the FCC on a certification plan approved by the Joint Board, comprised of federal and state regulators [CW, Aug. 6].

Basically, the Joint Board plan would require the FCC to test modems and then certify that they were technically safe to interconnect directly to the phone network without causing harm. Vendors would send sample units of their modems (or other devices) to the FCC for certification.

But IBM and AT&T have objected to this plan. They want the phone company to retain control over interconnection by using a device equivalent to the current DAAs. The FCC would set standards for these devices, known as Authorized Connecting Protective Modules (ACPM), but they would then be administered by the phone company instead of the FCC.

Ultimately, the ACPM would be built into a noncarrier device, to eliminate the separate DAA.

IBM has objected before the FCC to providing details of its units, it said, because eventually there will no longer be any difference between the modem and the DP system. When this happens, it would have to provide proprietary DP information to the commission when it wanted a device certified, IBM said.

For its part, AT&T wants to retain control over interconnection because of the harm it maintains will befall the telephone network. Bell has been using this argument before the FCC and other commissions since 1970, but has never demonstrated conclusively that such harm has resulted from interconnection.

Analysis

Meanwhile, IBM has thrown up another roadblock in questioning whether the FCC has the jurisdiction to regulate the way manufacturers build their equipment.

Some regulatory experts see this as a smoke screen, saying the intent of the FCC is only to assure that the device can be interconnected safely to phone company facilities. The FCC has no intention of interfering with any DP or other portions of interconnected devices, they said.

But the question of FCC jurisdiction is, nevertheless, very real in regulatory circles. A recent FCC decision that said the commission has jurisdiction over all interconnection matters, even those in the states, has been appealed.

Arguments in this appeal will be heard in September before the U.S. Court of Appeals for the Fourth Circuit in Richmond, Va. Known as the Telerent case, the final decision will have a bearing on an alternate interconnection plan, according to regulatory experts.

Another proceeding is being heard before the FCC itself. This one is known as Docket 20003, and it concerns the economic impacts of the interconnection of noncarrier equipment. The phone companies have long argued that the use of customer-provided equipment will eliminate a significant part of their revenue. As a result, the cost of service will rise for all phone company customers, they said.

Ironically, none of these basic issues were explored before the present DAA tariffs were approved to take effect in 1970. Some regulatory lawyers believe the DAA requirement would not stand up in court, if the validity of the current tariffs were challenged.

While these complicated issues are fought on the regulatory battlegrounds, data communications users must pay their local phone company monthly for each DAA they are required to install under the tariffs.

Almost all parties agree the DAA is on its way out, in favor of some alternative plan. What that alternative will be and how soon it will be implemented no one is sure.

Meanwhile, the phone company continues to collect up to $8.30/mo for each and every DAA installed. And, as usual, John Q. User is paying the freight.

In Opinion of Supplier

Modem Integration Not Present Prospect

By Ronald A. Frank
Of the CW Staff

BURLINGTON, Mass. – The modem will continue to be a separate device for some time and will not be integrated into larger terminals and other DP devices.

That is the opinion of Jerry Holsinger, president of Intertel Corp., a modem supplier. Holsinger made his remark in response to recent predictions from IBM and others that the modem would be absorbed into other devices and would soon cease to be a separate unit [CW, Aug. 6].

When terminals are built with integrated modems, they are designed to operate at one speed, Holsinger said. Since it is still not economically practical to incorporate a multispeed modem into a terminal, this would create a problem for the user who wants to increase his speed.

While it may be feasible to integrate modems for slower speed terminals operating at 300 and 1,200 bit/sec, there are few advantages at higher speeds. Most of the cost of higher speed modems lies in the logic circuitry, so sharing power supplies and cabinets through integration has few advantages, he said.

Terminal suppliers that also offer modems often do so "grudgingly and they don't pay much attention to the capabilities of the modem," Holsinger said. Actually the modems hold the key to keeping the user's network up and running, and it should be approached from that standpoint, he said.

The modem interface provides a convenient interface point at which to monitor what is happening in the network and should be combined with diagnostic capabilities, he added.

One of the advantages to the user of combining diagnostics with the modem is that it provides an efficient method to determine whether a network problem is being caused by the modem, the phone line or the terminal, Holsinger explained.

Asked whether he believes the advent of digital services will eliminate the modem, he said all-digital links are still a misnomer. As long as analog loops and off-net extensions are needed to provide access to the nearest digital service point, the user will have to utilize a modem, he said.

The added reliability of a service such as Bell's Dataphone Digital Service (DDS) is, in many cases, overshadowed by the lack of a backup facility. If a DDS link goes down, the user might have to resort to an analog line – and that would require keeping modems available in stand-by mode, he said.

Many users switch to dial backup on present private lines, but that poses few problems, Holsinger said. Usually the user merely has to switch the modem from the private line to a dial-up line in order to continue to transmit data.

Intertel provides a capability that allows a user at a central site to switch from private lines to dial backup simply by dialing two phone numbers. This can be done without an operator being present at the remote end of the line, Holsinger said.

Beehive Signs Agreement For Maintenance by Sorbus

SALT LAKE CITY, Utah – Beehive Terminals has signed a maintenance agreement with Sorbus, Inc. to maintain Beehive's Mini Bee and Super Bee video display terminals in 26 cities.

The servicing of Brilliant Bee, the firm's desktop "video computer," will continue to be the responsibility of Beehive's field service organizations.

VMF Terminals 'Customizable'

BAYSHORE, N.Y. – VMF Industries, Inc. has introduced a family of "customizable" terminals that range from numeric pad layout to 128-character keyboards.

Three basic models are available. The TR-10 includes up to 16 alpha keys, numeric pad, single-line 32-character gas panel display and send/receive capability.

Three switch-selectable data rates from 110- to 9,600 bit/sec are available with the TR-10. The unit costs about $900 or $50/mo on a three-year lease.

The KC-100 includes a full alphanumeric keyboard with cassette buffer, three data speeds and gas display. It can have up to 100 customized function keys and costs $3,000 or $145/mo on a three-year lease.

The TR-100 includes the same features and adds a magnetic stripe reader with a keyboard of up to 128 programmable keys using a microprocessor. Various line disciplines can be supported. The unit costs about $1,750 or $125/mo on a three-year lease.

Delivery is 30 to 45 days from VMF at 216 North Fehr Way, 11706.

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Terminal Transactions

Supermarket Scans 95% of Its Merchandise

ROCHESTER, Mich. – A supermarket here is operating with an automated checkout scanning system and an estimated 90% to 95% of the grocery items have been marked with scannable symbols.

Farmer Jack's supermarket, owned by Borman's, Inc., opened the automated store in the Winchester Mall here. Sperry Univac Accuscan checkout terminals are installed at all of the 11 checkout lanes.

In addition to the estimated 50% Universal Product Code (UPC) source-marked items shipped to the store, clerks are using a hand-held gun supplied by Vidac, Inc. to affix a "local-assigned code" (LAC) to items which would normally be price-marked.

Meat and produce is also being marked with scannable data with a Hobart 3000 electronic scale system. The 95% scannable items is believed to be one of the highest percentages now operating in any supermarket using scanners, according to a Univac spokesman.

The Accuscan system includes dual in-store controllers, each of which contains a price look-up data base for redundancy. Price changes are originated at the Borman central mainframe, an IBM 360/40, which transfers the information to an Olivetti terminal that produces a cassette.

This cassette is manually transported to the store, where the price change data is loaded onto one of the Accuscan controllers. Each checkout terminal is wired to both controllers for full redundancy.

When all 11 checkout scanners are operating, it takes less than one second between the time an item is scanned and the description and price are displayed on the terminal, a Univac spokesman said.

The optical scanners are within X-shaped slots at the end of each counter. They consist of fixed light beams which detect, read and decode the UPC symbols.

The system's control center then provides the price of the item, based on the code number, for visual display and register receipt printing.

On most items, checkers do not manually enter prices by punching keys. Instead, they slide items across the scanner and bag them in one motion.

The Farmer Jack's installation also includes "bagger-assist" stations for periods of peak activity. After items are scanned, they pass down a chute to a conveyor belt which moves them to a bagging deck.

"We are offering customers in our newest store the latest automatic checkout techniques in the supermarket industry," Dan Carpenter, vice-president of Borman's, commented.

The Accuscan supermarket checkout syatem uses an optical scanner within X-shaped slot for automatically reading UPC symbols.

"The system hopefully will both save the customer's time and increase our own operational efficiency. Prices are prominently shown on the shelves, on the display panels and on the customer register receipt tapes."

Prices are not marked on the 95% of the items which contain scannable symbols.

The system includes a store manager's console which provides information on item movement, cash flow, checker productivity and other selected areas.

The Accuscan system costs Borman's about $4,900/mo, including systems support and maintenance.

National Semi Has Datachecker

SANTA CLARA, Calif. – National Semiconductor Corp. has introduced an electronic cash register terminal for supermarkets.

The Datachecker system, Model T-2500, is said to be priced approximately $1,000 below comparable units. The T-2500 offers the features of a stand-alone electronic cash register as well as the ability to be upgraded to an in-store computerized checkout system, the vendor said.

The Datachecker can handle over 140 coded items and offers food stamp eligibility and accounting by department, two clerk totals (clerk accountability), quantity extension (multiplication), split pricing, checks tendered, tax eligibility and the ability to run automatic coin dispensers.

The T2500 interfaces with an electric produce scale. Weight is calculated to 1/100 of a pound and shown on the register display. The price is computed, displayed and printed on the customer receipt tape.

The operations are controlled by a National IMP-16 microcomputer. The terminal costs about $2,500 from the vendor at 2900 Semiconductor Drive, 95051.

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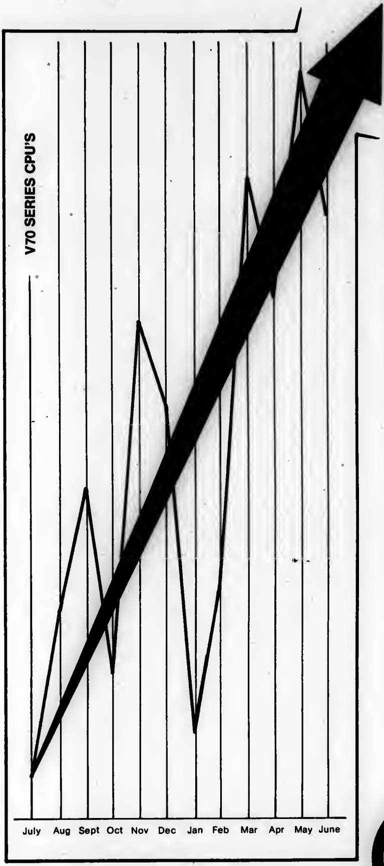

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Credit Authorization Net Links Seven Stores

LOS ANGELES – A credit authorization system that links seven California department stores has been installed by Fedco, Inc.

The turnkey system was supplied by TRW Data Systems and includes 251 Model 4103 terminals which are installed at sales locations in the Fedco stores.

The 4103 includes a 16-key keyboard, four-digit display and six discrete response indicators related to a credit authorization function.

Each store also has a Model 4135 CRT terminal used by the manager or other operator to provide check-cashing services.

At the Fedco central DP site in Anaheim, a Data General Nova 1200 serves as the mainframe to the terminal system. It includes a master disk file that contains over 200,000 credit records and over 50,000 check-cashing customer accounts.

Terminals in each store are hard-wired to a controller that can handle up to 128 Model 4103s. The system operates on-line to the Nova and data is transmitted at 1,200 bit/sec over Bell 3002 private lines in full-duplex mode.

The multidrop network includes eight controllers, and data is transmitted using modems supplied by TRW that are compatible with the Bell 202D.

The system is designed to handle upward of 30,000 to 40,000 transaction/hour and response time is currently "less than one second" for 95% of the transactions, according to a TRW spokesman.

The Fedco system includes all programming and maintenance from TRW and costs "about $10,000/mo," the TRW spokesman said.

Fedco uses its own Fedcharge credit card for credit transactions and the TRW network provides sales personnel with current information on account status, stolen credit cards and past check history.

System Eases Oil Production Reports

DALLAS – The complexities of producing oil are increasing. Recognizing that it could no longer rely on manual methods in recording its oil production transactions, American Petrofina, Inc. (API) recently installed Sycor Model 340 intelligent terminals in production field offices and its central office to replace a system of centrally keypunched, field-written documents.

Prior to installing the Model 340s, the production reports were manually produced in the district offices from data taken from run tickets (the document which tells how much oil has been pumped from lease holding tanks) prior to sending them to the central office for further processing.

This situation not only required double handling of the same document, but also required a balancing of the data used for production reports with the data used for financial accounting.

"And that wasn't always easy," said Karl Benson, manager of systems and programming at API. "Often there was a discrepancy between the calculations made manually in the district office and those made mechanically by the central computer."

Those run tickets, which were mailed two or three days before the end of the month, did not always get to Dallas until after the transactions for the month were closed and, thus, were not always counted in that month's revenues, according to Benson.

In the meantime, the run tickets which did get to Dallas for processing were keypunched, verified and then submitted in batches to the CPU.

However, Benson said, "some batches had to be processed three or four times before they were correct."

Terminal Transactions

In May 1974, API installed its first Model 340. It now has eight terminals installed.

Now, when run tickets are received in the company's Big Spring, Corpus Christi, Tyler and Wichita Falls production offices, pertinent data (lease number, tank number, temperature, gravity, meter reading or tank gauge measurements, etc.) is keyed into a Model 340.

After the data has been entered, it is printed on an attached Sycor printer for visual verification. If an error has occurred, the operator enters the ticket number, and the program determines the type of run ticket and displays the appropriate screen format. The operator then corrects the erroneous data and inserts the corrected information back on the cassette.

Because of the effort API has put into the Sycor project, Bob Condit, senior systems analyst claimed, data from the field is now usually 100% accurate when it arrives in Dallas for processing – eliminating the need for any editing programs in the mainframe.

At the end of each day, the terminals at the four field production offices are polled by a master station Model 340 with a 9-track tape drive in Dallas, and received data is processed on the company's mainframe. Reports are then transmitted in an unattended block and print mode to the field office printers.

Data Communications Management Theme of Five Datapro Seminars

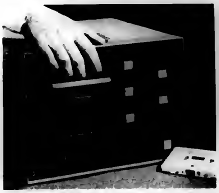
DELRAN, N.J. – Datapro Research Corp. has scheduled five data communications seminars to be led by consultant John E. Buckley.

The seminars, each three days and entitled "Data Communications System Management," will be held in five cities in the U.S. and Canada this fall as follows: New York City, Oct. 1-3; San Francisco, Oct. 8-10; Toronto, Oct. 27-29; Chicago, Nov. 17-19; and Washington, Dec. 8-10.

The seminars are intended for advanced technical and management personnel planning to implement a new data communications network or integrate a new system into an existing network or looking for ways to improve the performance of their existing communications configuration.

The enrollment fee for each seminar is $450, which covers instruction and course materials.

Datapro is at 1805 Underwood Blvd., 08075.



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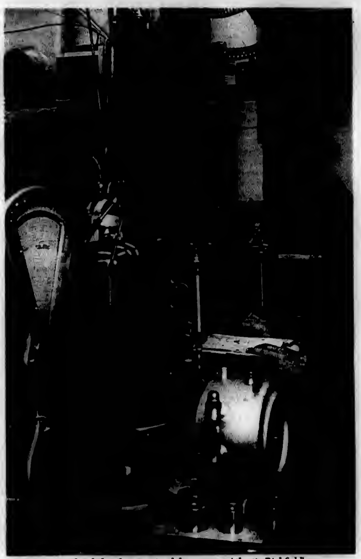
DP Dialogue

Notes and observations from IBM which may prove of interest to data processing professionals.



In the shale oil processing laboratory at Atlantic Richfield's Production Research Center in Plano, Texas, technicians gather data for later analysis by the System/370 Model 168 in Dallas.

Atlantic Richfield builds with MVS

The search for petroleum may occur offshore in the Gulf of Mexico ... or in Alaska, one of the last frontiers of North American oil exploration. Soundings are made. Seismic graphs are plotted. Geophysicists determine if the structure can be associated with hydrocarbon deposits. After discovery, reservoir engineers estimate how much oil might be there, and decide what recovery procedures should be taken.

"Now that easy oil discovery is a thing of the past, the technology of exploration is far more complex," says Howard Woods, Jr., Manager of Data Processing for Atlantic Richfield Company's North American Producing Division in Dallas. "Our scientists, planners and administrators need to analyze a rapidly increasing wealth of data."

Last year the company decided it had outgrown its traditional OS/MVT multiprogramming operation, which was mainly batch. "We knew we had to enlarge the scope of our system," says Woods. "We not only needed virtual storage capability, but also a sophisticated data communications network."

To help reach these goals, Atlantic Richfield installed a System/370 Model 168 in June of 1974 to replace a Model 165 with OS/MVT. By Novemher, the new computer was running totally under control of MVS (Multiple Virtual Storage).

MVS is the general term for OS/VS2 releases, starting with Release 2. As its name implies, MVS provides each individual user with several million bytes of virtual storage.

Equally important, MVS has helped improve response time for a growing number of interactive users at Atlantic Richfield. About 80 percent of the jobs are now remotely entered. "Under MVT," explains Woods, "TSO, the Time Sharing Option, was merely peripheral to the system. In MVS, TSO is an integral part of the system, and terminal response times are more consistent and less impacted by other jobs being processed. We can set up a level of service and be sure it will be met. And with our enlarged online storage facilities, more interactive users can tackle more program development work."

Reliability has also been improved. Before MVS, if a control program failure occurred in the system, every program had to be started again from scratch or from its restart point. "Now," says Woods, "the system can recover from many of its own failures and normal processing can continue."

One of the company's greatest benefits to date with the virtual storage capability of MVS is in scheduling large jobs. "Formerly," says Woods, "a setup problem in a long-running program might require a complete rerun, taking several hours over several days before we could get a correct run. Today, with the virtual storage capability of MVS, we can take a subset of the data and do a ten-minute run during prime shift to validate the job parameters in an application such as reservoir modeling. Then we can run the entire job with confidence during non-prime shifts. Besides saving machine time, we save two days in turnaround time."

For the future, Woods points out that MVS will support a Multiprocessor 168 installation at Atlantic Richfield in Dallas. And with VTAM (Virtual Telecommunications Access Method) and NCP/VS (Network Control Program/Virtual Storage), MVS will serve as a base for further enhancements in remote data entry and job entry.

"Our goal," says Woods, "is to give our users in remote district and field offices, as well as our Dallas staff groups, direct access to the full virtual storage resources of our central computer at a price they can afford. MVS is instrumental in helping us do just that."

"We Need a Special Report This Afternoon..."

The request is urgent. It could spell the difference between a good and bad decision. But can the necessary information be organized in time?

That's the kind of situation Lloyd Dutches, an assistant vice president in the corporate customer systems section at the Mellon Bank in Pittsburgh, must be able to respond to quickly. He recalls a request posed by the commercial loan department: "They wanted to know what effect changing the prime lending rate by 1% would have on Mellon's corporate loan customers. That meant identifying which loans were tied into the prime rate, calculating new accruals for each to reflect the new prime, and, finally, indicating how that would affect the bank's earnings."

Gathering those particular facts would have taken several weeks if traditional programming methods and languages had been used. But Lloyd Dutches was able to get the relevant information to the loan department within one day.

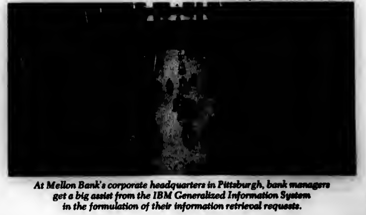
He did it by using the IBM Generalized Information System (GIS) to write a simple program for one of Mellon's System/370 Model 168s. GIS is a programming language written in statements similar to English. It allows the user to formulate "what if" queries with many fewer instructions than would be needed in conventional programming languages.

The simplicity of GIS is based on its powerful query language and its Data Description Tables. The query language provides many automatic functions that enable the user to manipulate or modify his data and present it in well-organized formats. Prepared by data processing professionals and accessed by GIS, the Data Description Tables contain detailed information about each file. The user merely specifies the field needed and format desired.

Using GIS, queries can be formulated under batch mode, or they can be made online through display terminals running under the Time Sharing Option (TSO) or with the data communications feature of the Information Management System (IMS).

"The commercial loan department keeps extensive data files on receivables, loan maturity dates, identification numbers of officers associated with each transaction, cash flow expectations and different kinds of collateral fields," notes Dutches. "For example, a loan officer may come to us with a general idea of the data he or she wants, but with no specific guidelines as to format. GIS gives us the flexibility to

(Continued on next page)



At Mellon Bank's corporate headquarters in Pittsburgh, bank managers get a big assist from the IBM Generalized Information System in the formulation of their information retrieval requests.

Bill Stringfellow explains how, through the use of a special tool, an eight-tube pluggable unit was set into a 701 computer. Alongside is an integrated circuit many times smaller, which performs comparable logic functions thousands of times faster in today's System/370.

The way things were...

Remember 1953? The beginnings of the "Silent Generation"? General Eisenhower had recently been elected President in a landslide victory over Adlai E. Stevenson. Americans were reading Ernest Hemingway's *The Old Man and the Sea*. And teenagers in bobby-sox and saddle shoes were listening to songs like "How Much Is That Doggie in the Window?"

That spring, IBM announced its first production computer—the 701. The new computer included features then considered to be technological breakthroughs—capabilities such as memory and stored programs.

For those who have come of age during the era of micro-electronics, the interior of the 701 would seem like a Model T Ford—thousands of vacuum tubes, which performed logic functions, and scores of cathode ray tubes which stored up to 2,000 words of information.

"Fixing that computer required constant surveillance," recalls Bill Stringfellow, the IBM field manager who supervised the installation of the first 701 at the Atomic Energy Commission's facility in Los Alamos, New Mexico. "The vacuum tubes and cathode ray tubes [CRTs] had limited life expectancies. Filaments would burn out, or the phosphorous coating on the CRTs might degrade and cause errors. You could actually see a tiny matrix on the surface of the CRTs where the electrostatic charges representing zeros or ones were stored."

Sometimes unique problems developed. "During the first few weeks, the tape in the drives became tangled. We worked around the clock checking all the electronics, but found nothing," relates Stringfellow, who is now manager of advanced maintenance development for the IBM Field Engineering Division. "Finally, we realized that the extremely low humidity in the desert caused the tapes to build up huge static charges which made them cling to the reels. A simple humidifier solved the problem."

Programming the 701 was all done in machine language. Higher-level languages like Fortran or Cobol didn't exist, and the mathematicians and physicists at Los Alamos wrote all their own programs, which required detailed instructions for every calculation.

"At first, when results weren't what they expected, I would hear, 'the computer must have made a mistake,'" recalls Dura Sweeney, then assistant group leader in theoretical physics at Los Alamos and now director of strategy development for the IBM Field Engineering Division. "But as they became used to the computer, that soon changed to 'I wonder where I goofed.'

"We were all amazed at the 701's speed. It wouldn't seem like much today, but 14,000 calculations per second represented a real achievement then," adds Sweeney. "It meant that we could solve the complex equations of fluid dynamics faster than we had ever dreamed possible."

Special Report...

(Continued from preceding page)

select an initial format which can be changed very quickly if the officer decides to present the material in a different way."

Other Mellon departments have also used GIS successfully. In the personnel area, for example, policies relating to profit-sharing eligibility, compliance with the Equal Employment Opportunity Act and determining comparative costs of various retirement plans have been explored with GIS.

In financial planning, Thomas Mosimann uses GIS to weigh alternatives: "Most of our work involves analyzing dynamic situations. What is critical today may not be relevant tomorrow. GIS gives us the flexibility and speed to deal with changing priorities."

Within Information Processing, GIS has been used heavily as an analysis tool. Thomas Ericsson, assistant vice president of systems programming, reports: "We are particularly pleased with GIS' versatility. It is an important component of the set of tools we use to analyze systems performance characteristics on a daily basis. Through GIS, we can access System Management Facility [SMF] data and quickly provide our management with 'snapshots' of any or all of our cpus over a specified period of time."

"Many end-users now handle their own information retrieval requests with GIS," reports Edward Williams, vice president of data processing and systems programming. "And when they do come to Information Processing for help with more complex queries, our programmers may use GIS themselves, resulting in greater productivity."

Dating Slides of Pre-Columbian Art by Computer

When art historian Luraine Tansey received a bequest of slides depicting Pre-Columbian art a few years ago, she knew she had a difficult classification problem to solve.

"We were given documentation on the exact sites at which the original objects were found along the southern coast of Mexico. But we had no idea how to date them," explains Mrs. Tansey. "The job was enormous because the Pre-Columbian period refers to the time before the mid-15th and 16th Century Spanish conquest of the Americas. We needed some established guidelines to arrange the material chronologically and stylistically."

Mrs. Tansey and several of her students at San Jose City College in California have recently developed four computer data bases which contain information on other Pre-Columbian slides already in the college's collection. These are arranged by author, chronology, site and period. The data is coded on punched cards and entered into a System/370 Model 135.

"From various printouts, we can locate the slides closest in characteristic to any new slide we want to date," notes Mrs. Tansey. "Furthermore, we can establish more logical dating from a wide range of scholarship in an area and determine what discrepancies exist among authors. New information can be added at any time."

In addition to her work in dating Pre-Columbian art, Mrs. Tansey is one of the first scholars to apply classification of slides by computer on an interdisciplinary level spanning such fields as architecture, geology, archeology, medicine and botany. She has lectured on the subject at universities and symposia around the world.

"Computer-based cross-indexing of slides is the most efficient and economical means for museums and libraries to share their knowledge and reduce the need to duplicate expensive cataloging efforts," says Mrs. Tansey. "Eventually, I believe, many museums and libraries will use terminals linked to a central data base for this type of research."

PHOTO: COURTESY OF THE AMERICAN MUSEUM OF NATURAL HISTORY

This Mixtec pottery vessel, with a painted figure believed to represent the god of games and feasting, was found in Oaxaca, a state of southern Mexico. It is an example of Pre-Columbian art from the Post Classic period between 900 and 1500 A.D.

A New Tool for Telescopic Mirror Designers

Predicting the stresses that a telescope mirror undergoes when it swivels about in an observatory has long been a challenge for optical designers. Today the problem of stress and the resulting deformation is more crucial than ever before in the design of mirrors for large-scale earth-orbiting telescopes. These mirrors must be able to sustain incredible structural and thermal demands. They operate under extreme space conditions, they must survive severe launch forces, yet their weight must be kept to a minimum.

At Perkin-Elmer, the company's IBM System/370 Model 158 is playing an ever-increasing role in the mathematical modeling of mirrors. George Hefferon, Systems Analysis Manager at the company's Optical Technology Division explains: "With our new computer modeling capability we can tackle more design problems than ever before, especially in the critical area of deformation prediction."

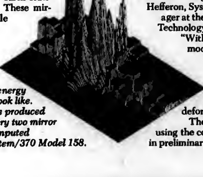
The company has been using the computer extensively in preliminary design for optical, structural and thermal analysis. But modeling of large space telescope mirrors is a relatively new computer application.

Recently Hefferon and structural analyst Peter Johannsen set out to verify the capability of computer models to predict accurate deformation.

Using NASTRAN (a NASA Structural Analysis program) Johannsen and Hefferon made a computer model of an already existing mirror. "We then predicted what the mirror's deformation would be when under load," says Johannsen, "just as though we were designing the mirror from scratch. Using an interferometer, we later measured the actual deformation of the real mirror."

When both results were compared, computer-predicted deformation matched actual deformation within a millionth of an inch. "This proved conclusively the remarkable accuracy of computer modeling," says Johannsen.

Now Perkin-Elmer is using computer models in the design of large-scale telescope mirrors. Says Hefferon, "It is no exaggeration to say the computer has become a new design tool that has expanded our whole capability."



What an uncorrected star energy system might look like. This image was produced by an elementary two mirror system and computed on an IBM System/370 Model 158.

DP Dialogue appears regularly in these pages. As its name suggests, we hope DP Dialogue will be a two-way medium for DP professionals. We'd like to hear from you. Just write: Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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Bits & Pieces

CMI Increases Modularity Of Stor 10 Add-On Memory

BEDFORD, Mass. – Cambridge Memories, Inc. (CMI) has repackaged its Stor 10 add-on memory into modular units that can be easily interchanged, upgraded or maintained, according to the firm.

The memory is intended for use with Digital Equipment Corp. Decsystem-10 CPUs. Its increased modularity is said to offer users several ways of configuring or expanding the memory not possible with the previous Stor 10.

Among the changes are: the ability to increase the number of data ports from four to eight, two-way or four-way interleaving and simultaneous access to any of the data ports.

Maximum storage capacity is now up to 4M words and rapid reconfiguring of the size, data transfer rates and throughput of main memory is said to be practical.

Stor 10's basic memory capacity ranges from 32K to 256K words, plug-expandable in either 16K-word or 32K-word increments. In a configuration with multicontrollers, however, the memory can be expanded to 4,096K words.

The Stor 10 costs about 40% less than DEC's add-on memory, a CMI spokesman said.

The firm is at 12 Crosby Drive, 01730.

UPS Available From Cyberex

MENTOR, Ohio – An uninterruptible power system (UPS) from Cyberex, Inc. provides more than 25% greater reliability than conventional step-wave designs and at a lower cost, according to the firm.

Designated Delta-Y, the system consists of a 100% solid-state inverter and subcycle static transfer switch. Both employ solid-state circuitry using about one-third fewer components than other designs, the firm said.

A 75-KVA converter system costs $37,000 plus batteries from the firm at 7171 Industrial Park Blvd., 44060.

SME Offers CAD/CAM Handbook

DEARBORN, Mich. – "CAD/CAM and the Computer Revolution," a publication of the Society of Manufacturing Engineers (SME), is intended to serve as both a handbook and reference volume on the subjects of computer-aided design (CAD) and computer-aided manufacturing (CAM).

The 360-page volume contains 25 papers presented at the first two CAD/CAM conferences sponsored by the SME.

The books costs $12.50/copy or $10.25/copy to SME members from Publication Sales, Society of Manufacturing Engineers, 20501 Ford Road, 48128.

In Wake of Firm's Departure

Vendors Offer Support to Xerox Users

By Patrick Ward
Of the CW Staff

A number of suppliers are jumping into the vacuum created by Xerox Corp.'s Data Systems Division's decision to leave the mainframe market [CW, July 30].

The vendors are offering varying degrees of hardware and software support, peripherals and even an on-line information file of Xerox CPUs and parts.

Telefile Computer Products, Inc., which had been promising Xerox users a new product every month prior to the mainframer's departure, has announced it will do its "utmost to keep enhancing the computers already in place worldwide."

Citing the massive software investment of many Xerox users as a reason for them "not to panic or defect," Telefile said it plans to introduce multiplexers input/output processors, 200M-byte disk systems and tape drives for Xerox systems.

The firm also plans to bring out a memory map for the Sigma 5 so it can run under Xerox's CP-V operating system, keyboard send/receive (KSR) consoles, card punches, electrostatic printers, plotters and other peripherals.

Telefile said it is steadily increasing its software capability, but "it is somewhat limited now to software support rather than to new developments."

It is also expanding its maintenance sites around the country and has brought several slightly used Xerox systems to enhance its spare-parts capability, Telefile said.

In addition, the firm has been talking with Xerox about manufacturing rights on the Sigma 5, 6 and 7 and expects to discuss other mainframes as well, plus software documentation and spares.

Telefile is at 17131 Daimler St., Irvine, Calif. 92705.

Depot-Level Support

Quelex Data Systems also said it will provide depot-level maintenance support for any Xerox users.

The firm specializes in repair, refurbishment and maintenance of equipment manufactured by Xerox and other mainframers.

Depot-level maintenance is not to be misunderstood as full third-party maintenance service of the type provided by Comma and Sorbus, the firm pointed out.

Quelex is at 8740 Shirley Ave., 91324.

Information Clearinghouse

Tymshare, Inc.'s Valcomp Division has announced it will provide a free information clearinghouse service to assist Xerox users as the manufacturer winds down its product and support activities.

The Valcomp data base will be an on-line information file on Xerox equipment and components for users looking to acquire or dispose of Xerox CPUs, memories, peripherals or spare parts.

The firm is at 31355 W. Agoura Road, Westlake Village, Calif. 91361.

Additionally, Standard Memories, Inc. is considering supplying add-on and replacement core memories for Xerox 500s, 900s and 9300s as well as the Sigmas, the firm said.

The firm is at 2801 E. Oakland Park Blvd., Fort Lauderdale, Fla. 33306.

In-House Time-Sharing at Ford Set for 'Almost Any Problem'

DEARBORN, Mich. – Some 5,000 engineers, technicians and support personnel at Ford Motor Co. are now using what a company official described as "one of the largest on-line time-sharing computer services in private industry."

Engineers use the system for everything from checking special emission standards on cars slated for California delivery to simulating how quickly drivers will wear out a suspension system.

The operation has "the variety, the flexibility and the power to handle almost any problem our user community comes up with," said M. Paul Anderson, manager of the computer sciences department at Ford's product development group.

Anderson said about 250 terminals are used with the host system. Some 100 may be on-line simultaneously.

Ford has built its system around two Honeywell Model 6080 CPUs. The two systems provide 256K words of memory and on-line storage capacity of 1.5 billion characters.

The computer system currently supports 15 magnetic tape units, two Datanet 355 communication processors, three high-speed printers, two card readers and a card punch.

The biggest challenge in running the service is compatibility, Anderson said. With so many users, he added, it is impossible for Ford to reeducate them every time there is a hardware change in the system.

The problem is complicated by engineers who are "casual users," communicating with the computer only once or twice a year. "They have trouble remembering the phone number for the computer, so you can imagine how complicated things would be if we made major changes in the interface every few months," Anderson said.

His staff tries to make it as easy as possible on users when a change in hardware, software or applications packages is required, he said. "We try to keep the system looking the same to the user all the time," Anderson said.

In Industrial Firms

One Terminal Serves All Users

SUNNYVALE, Calif. – The MIT-130 from Data Pathing, Inc. (DPI) is said to incorporate factory data collection, office data entry and inquiry response tasks onto a single terminal system.

DPI, a turnkey vendor, said it offers custom software with the IBM 3270-compatible system.

The MIT-130 system can support CRTs with four different application-oriented keyboards. For example, a CRT can be used both as an IBM 3270-compatible inquiry response station, and as a factory data collection station with card scanner, badge reader and printer.

Data collection (DC) mode is supported by application language programming resident in the DPI System 150 communications processor.

Transparent mode (TM) is an emulation of IBM's 3270 system on an MIT-130 display station and can be supported by application programming resident in an IBM 360/370 host processor.

Transparent mode of operation is provided to allow use of MIT-130 display stations as IBM Model 3277 terminals and thus eliminate the need for reprogramming.

Intended for distributed processing, the MIT-130 system uses local or remote cluster controllers that can serve from 12 to 48 CRTs, depending on screen sizes.

The system's DPI System 150 communications processor can handle up to 64 controllers, a spokesman said.

A system with 24 data collection terminals, each with badge reader, card scanner and 240-character display, costs $141,000. The DPI communications processor costs $120,000. Lease plans are available from the firm at 370 San Aleso Ave., 94086.

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The Hewlett-Packard 3000 is a minicomputer?

"The 3000 a minicomputer? I think calling the 3000 a mini is an abomination!"

When we asked Mr. Thomas Harbron, Director of the Computing Center, Anderson College, Anderson, Indiana, what he thought about the HP 3000, he had some very interesting things to say:

"We're using the 3000 for administrative processing, academic work and some commercial work. We have 27 terminals and we selected the 3000 because we wanted a system that would provide us with remote access and would do general purpose types of things from the terminals. The 3000 allows us to do many different things at different terminals. In fact, it does everything we expected it to do and was the only machine we could find in its price class that would. I'd recommend the 3000 to others. It's a powerful and versatile machine. And it's cost effective as well. It's half the price of anything that comes close to it."

"I don't think that Hewlett-Packard ought to call the 3000 a minicomputer. It is a complete medium-sized system."

That's what the EDP center manager of an aircraft manufacturer said about the 3000. He also had this to say:

"One primary reason we bought the 3000 was to collect and analyze radar development data. The problem is that we have to collect data fast enough, pipe it to a computer, analyze it, and then make the necessary instrument adjustments. HP's 3000CX was the answer. We also bought it for its interactive capability. Very significantly, in our acoustics department we had to have the ability to turn around data analysis fast. The 3000 has been a real cost saving computer for us. For the last two years I was the entire staff for the 3000. Not a great deal of detailed knowledge of the system is necessary. Technicians can use it without much training. I'm very much sold on the 3000. And it's definitely a complete system—not a minicomputer."

"It allowed us to run eight times the volume at a third the cost. No minicomputer could do that!"

The above statement was made by the corporate banking division EDP manager of a major California bank. He also said:

"We've had the 3000 for over nine months. A year ago we were on a time-sharing system and the cost became prohibitive. We contacted six different companies to look over and bid on a proposal that defined our needs. HP was the only one that could handle our total application of management information for the Corporate Banking Division. The 3000 is not just a mini—it's much more. We're constantly amazing people here with what we can do. It's not hard to operate, not hard to cope with. But our favorite topic is that we're paying less than one third of what we were paying and running four times the volume. And this year, we'll double our volume again. That's eight times greater and less than one third the cost.

That's really productivity!"

"We found the only thing mini about the 3000 was its price."

When we asked the EDP center manager of another major manufacturing company about the 3000, that was what he had to say. He also had this to say:

"Our computer needs include both scientific and commercial applications. We were phasing out our teleprocessing terminal and our Environmental Monitoring Division's computer. So we started looking. We spent several months studying computer systems, and rated them on speed, versatility and ease of operation. The result of our study showed that the HP 3000 provided these requirements and had the best cost/performance ratio. We didn't fully realize the potential of the 3000 until we started programming it. We have experienced a significant cost savings in the seven months we've had the 3000 and we expect a greater savings in the months ahead. We really like the interactive CRT for programming and data input. Being a multi-programming system we can have many users on at the same time. The power and speed of the 3000 is equal to a large machine. It's no mini. Calling it the Mini DataCenter is more accurate. I'd definitely recommend the 3000 to other potential users. In fact, we already have. We feel they would be money ahead."

We're glad these and other users of the HP 3000CX set us straight. We called it a minicomputer because its state-of-the-art technology lets us sell it for a minicomputer price. From now on we'll call it a Mini DataCenter.

We want you to get the whole story. Write us for your copy of our HP 3000CX Mini DataCenter booklet. We know you'll find it interesting, informative, and maybe a bit surprising.

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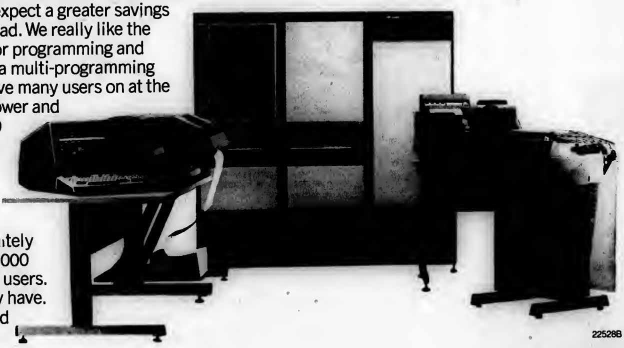

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Five-Year Plan Helps Va. County Stretch Its DP Dollar

FAIRFAX, Va. – Fairfax County is entering the second year of a five-year program designed to ensure that the county government gets the most for the money it spends on computer applications.

So far the program seems to be working. The county has an IBM 370/155 and had originally planned to add a 370/145 in fiscal 1976.

The program is outlined in the document, "Fairfax County Computer Systems Plan, 1974-1979." It was prepared by the County's Cooperative Computer Center Committee, made up of representatives of major users of the center, and is said to be one of the first of its kind among local governments.

After analysis of the plan, however, the committee decided the county did not require a second CPU until fiscal 1977 at the earliest.

The history of computer applications – in local government and elsewhere – is filled with instances where the hardware determined the applications, committee members decided.

The experience of the DP people on the committee was that agencies often bought or leased computers without detailed plans for their use.

As a result, applications were limited by the capacity of the equipment or, more often, the equipment procured was much more sophisticated than needed, and the agency found itself paying for unused capacity, a situation which encourages unnecessary or uneconomical applications.

The purpose of Fairfax County's Computer Systems Plan is to plan computer applications to be developed over a five-year period, to ensure that only those systems for which computerization would be both appropriate and cost-effective actually are computerized, and that equipment leased or purchased is sufficient but not excessive for the applications planned.

Centralized Operation

The county also hopes to keep its DP operation centralized. "If it were not an efficient centralized operation, agencies would go out and buy their own equipment," a spokeswoman said.

More than 60 application systems now are in operation. These include real estate and other tax assessment and billing systems, school facility and material support systems, school pupil scheduling and records and library circulation control.

There is also a juvenile court record system, follow-up on parking tickets, analysis of fire incidents, voter registration, the Virginia Uniform Welfare Reporting System, food stamp issuance and water and sewer billing.

The Urban Development Information System keeps track of land use on a parcel-by-parcel basis. The police management information system, the county government and school system's financial accounting, personnel position control and preparation of payroll checks for all county and school administration employees and a wide variety of other internal management and information systems are also done on the system.

Anticipated Projects

The five-year plan described a number of anticipated projects for the design of new or revised computer applications which should expand or add considerably to the roster of operating systems. These anticipated projects include:

- Analysis of crime patterns and trends.
- Automated assistance in acquiring library books and preparing the book catalog.
- Processing of voluminous lab tests from sewage treatment plants.
- Planning of school lunch menus, inventory and finances.
- Dispatch of fire, rescue and police vehicles in emergencies.
- Quick location of autos towed by police or articles recovered.
- Identification of causes of pupil accidents in schools.
- Support for the computerized annual assessment of taxable real estate.
- Immediate access to firebox locations for fire companies.
- Standardization of mailing lists of residents.

Some county agencies are slated in the plan for computerization of massive paperwork tasks, including the docketing of criminal cases in the courts and recording of building permits by the Department of Environmental Management.

Avoiding Duplication of Data

A major characteristic of many of the planned projects is the interrelationship of systems designed for various agencies.

This element of the systems' design will avoid duplicate data collection and administrative effort, as in the possible computerization of the Department of Environmental Management building permit processing, which would facilitate scheduling of inspections and provide input to the Urban Development Information Systems and data of interest to other county agencies affected by building plans.

Similarly, interrelation of systems concerned with planning will make it possible for planners to simulate the effects of a zoning decision on traffic congestion, air pollution, sewage capacity needs and other consequences vital to public policy-making.

Equal Status

An unusual aspect of the county's cooperative computer center – probably unique in local government – is that it serves not only the general county government but also the county public school system and the Fairfax County Water Authority.

The three organizations have equal status on the committee which manages the center.

The center also provides computer service to the Federal Trade Commission (FTC) under a contract which has been in effect since 1973.

The number of jobs processed by the center increased to 9,200/mo in December 1974, a rise of 67% from July 1972.

Inquiries and other transactions performed through the 48 remote terminals in county offices increased from 42,000/mo in July 1971 to 432,000/mo in January 1975, but, in the same time period, equipment expenditures dropped from $70,000/mo to $61,000/mo, according to data contained in the plan.

The plan also noted that large additions of staff are not immediately foreseen.

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Offers Several Advantages

Data Module Use Seen Increasing

By a CW Staff Writer

SANTA CLARA, Calif. – Most of the disks that manufacturers will introduce in the next few years will use data module technology because it offers significant advantages, according to Steve Stone, product planning manager at Memorex Corp.

In the data module, the head that writes the data is always the same head that reads it into the system, thus eliminating head misregistration caused by differing head alignment between spindles.

This reduces the propensity for errors and eliminates the expense of periodic head realignment, he said.

The disk is coated with a permanent dry lubricant to protect it from wear caused by the landing of the heads when the module undergoes start/stop operations, he added.

The heads enclosed in the data module are lighter and closer flying than any previous disk heads. The module contains two heads per data surface, which improves access time since each head only has to cover half the area.

As with any head/disk system, the components must interact correctly to insure proper performance.

Head Crashes Reduced

The module's sealed plastic cover, designed to protect the disk surfaces from contamination, should reduce the incidence of head crashes, Stone pointed out.

Another design feature which will help eliminate head crashes is reduced head loading force. Module heads are loaded with only one-third the head load force of the IBM 3330 Model 11, Stone said.

This reduced pressure on the head/disk interface and the lubricant used on module disks will reduce friction and damage if the head and disk are in contact when they should not be.

But modules have introduced some new problems, Stone noted. During early design stages, there were some complaints about pulley wear and seek errors, but those have since been corrected.

Capacity Justifies Price

Although the price of data modules is substantially higher than the price of disk packs, the increased capacity over the files that they are replacing and the reduced price of the disk drive make the cost of data module storage competitive with that of disk packs, Stone explained.

The IBM 3340 pack, which was introduced with the IBM 370/115. was intended to do the job for that system that the 2311 did on the System 360.

The cost of storage on the 70M-byte data module is $6.26/mo per megabyte, compared with $73/mo per megabyte on the 2311 when it was first introduced and $14/mo per megabyte for the 2314 when first introduced.

Current monthly cost per megabyte from independent suppliers has now dropped to $43 for the 2311 and $9 for the 2314, Stone indicated.

Interesting as cost comparisons between various alternative disks are, they are not particularly meaningful because the CPU decision usually determines specific disk files, Stone pointed out.

As an example, the 3340 module is the only disk storage facility that attaches to the 370/115, he said.

In addition to use on IBM 370s, the use of components of module technology in new, nonmodule applications is being investigated by manufacturers.

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Shukan Computer, Computerworld's sister publication in Japan, is a joint venture of Computerworld and the leading electronics publisher in Japan, Dempa Publications. Shukan is the only newsweekly for the computer community in Japan and with the combined resources of the two companies, it has the largest news gathering organization of its kind in the world.

Japanese businessmen read more than their American counterparts, and they place a greater value on the advertising they read. Buying decisions in Japan – unlike the common American system of one-man, "EDP Manager" control – are reached through development of consensus between several levels of operating management, including programmer and analyst levels. And Shukan goes to all these important buying influences. 23.5% of total circulation goes to Data Processing Management, 12.5% to Corporate Executives, and 27.9% goes to Professional Staff in the computer industry.

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Handles Total DP

Cobol on Key-to-Disk Unit Fixes Milk Agency Problem

By Vic Farmer
Of the CW Staff

BOSTON – Key-to-disk and intelligent terminal systems vendors have added much CPU and programming power to their systems.

As a result, some users can fulfill their DP needs just by acquiring what larger users would consider a data entry peripheral.

This is what happened here at the Federal Milk Market Administrator Office which leased a key-to-disk system earlier this year.

This branch of the Federal Government selected a Four-Phase Systems, Inc. IV/70 configured with 48K-byte memory, two disk drives with a total storage of 5M bytes, three CRT keystations, and one 300 line/min printer.

This configuration – typical of an ideal interactive small business system with CPU, disk power, CRTs and printer – was the coup de grace that led the agency to drop its reliance on a service bureau and 80-column cards and tackle its own data processing.

One of the most interesting aspects of this conversion was the ability of the IV/70 to use the basic Cobol programs previously used on the Honeywell 400 series computer at the service bureau.

True, certain small changes had to be made, but, in all, said Richard Murphy, systems analyst for the agency, conversion was relatively minor. About 35 programs were adapted within the last several months.

Murphy was in a bind when he was selecting a system because it had to be compatible with Cobol so that other branches of the agency could use his programs if desired – and most small systems are not Cobol-compatible.

He was amused by the resistance of the local salesmen to endorse his use of their key-to-disk system as a neat, small business system.

Murphy's problem was realtively simple – in addition to a large number of summary reports, he had 12,000 record files with which agency persons worked to put on-line.

With the service bureau setup, he had one IBM 029 keypunch, an IBM 059 verifier and had to constantly interact with the service bureau to correct and maintain his programs and data.

Data Entry Package

Now the agency uses the data entry package provided by Four-Phase, which incorporates the standard key-to-disk formatting and data validation features, lowering the number of keystrokes necessary.

The source records, however, are transferred from the IV/70 disk to a disk formatted for Cobol processing.

Because the disk-to-disk transfer must be done on a batch basis, the initial Cobol processing usually involves multifunctional merge programs. So the batches are merged into one file, and sort keys are added to each record for further processing, according to a programmer for the agency.

The files then are usually sorted, and an exception edit run is performed.

Errors in small data files are usually corrected on the Cobol disk operating system. But the system is limited to only one screen operating with this application, and the file must be accessed sequentially.

Larger data files with numerous errors, therefore, are usually corrected in the original IV/70 data entry correction mode. The file is then retransferred for Cobol processing.

Each system run contains a series of

(Continued on Page 32)

Sea Structures Studied

Lloyd's Register of Shipping in London uses a Digital Equipment Corp. PDP-11/45 and this Vector General three-dimensional graphical display system to prepare and check data for the analysis of large offshore structures.

Here, a member of the firm's programming team works on integrating the graphics system into the overall DP center data base to study the strength analysis of fixed concrete platforms, steel jacket platforms and mobile semisubmersible rigs that are used in oil drilling at sea.

The system also communicates with Lloyd's IBM 370/158. The 11/45 has 64K words of main memory, two cartridge disk drives and a magnetic tape drive. With the display, an engineer can picture a structure, then add to, change or rotate the view.

Pencils, Cards . . . to Twin Minis in 14 Months

NORTH LAS VEGAS, Nev. – What began just 14 months ago as a modest effort to cut down on paperwork has resulted in an automated on-line information system that not only has added 12% to the police force coverage of this city, but also has brought a new level of efficiency, control and performance to the small-city police force.

In the seven months since the police department began full-scale operation of a computer-assisted dispatch system, the city's 150-man police department has saved an average of one hour/man-day in recording, compiling and summaring statistics related to emergency and nonemergency police calls.

The twin Wang computer systems have provided major management, administrative and operational benefits, including: faster dispatching of police units, improved analysis and faster turnaround of crime statistics and analysis of manpower patterns and productivity down to the level of each patrolman on each shift.

The city decided in May 1974 to modify its dispatching system to ease the paperwork problem. By July, it had converted from manual forms to punched cards on which dispatchers and patrolmen could more quickly record their activities.

The punched card system relieved some of the pressure, but added a required step of data conversion to computer-processable form.

At that time, the police chief decided to investigate an even more sophisticated and rapid method of keeping track of dispatching functions. He retained the consulting firm of Joseph W. Larimore & Associates of St. Louis, Mo., to modify and install a generalized dispatch system to perform that function.

The system operates on twin Wang 2200C computers directly linked to one another and enables dispatchers to transfer data instantly between each other. Both computers share a common disk storage device and line printer.

At the dispatching center at police headquarters, two dispatchers handle the 1,000 complaints received each day through two CRT terminals.

Telephone calls from citizens and radio calls from cruisers on patrol are funneled to one operator, who records the pertinent facts related to each call by keying them onto the screen.

When the data is completely recorded (a process that takes an average of 35 seconds per citizen call), the operator presses a special function key that sends the completed record to the screen of the dispatch operator.

On the second CRT, the complaint record is displayed on the top half of the 1,024-character display. At the same time, the status of each of the up to 28 patrol units is constantly visible on the bottom half of the screen. Such status indications include: units available, units responding to a call, units assisting another officer and other conditions.

The dispatcher then sends a voice command to the closest available unit to respond to a given complaint.

During the past five months, the efficiency of the dispatching function, coupled with the greater available manhours, has enabled the department to cut its response time in emergency calls to less than three minutes from the time a call is received. In nonemergency situations, the average response time is under four minutes.

Concurrent with the recording of complaints and the dispatching of patrol units, the Wang 2200s are also capturing radio information which forms the basis of automated logs and records.

Two-Way Data Flow

Each patrol unit must report when it arrives at the scene, the nature of the incident, its disposition and a variety of ancillary data, including pertinent names, addresses, assistance requests, national crime requests and completion of assign-

(Continued on Page 33)

The DTC-300 ..... $3690 .... Qty. 1*

Data Terminals and Communications engineered the first micro-processor controlled, Diablo printer based communications terminal over two years ago. And now, with more than 1900 units in the field, the DTC-300 continues to set the standard for versatility, reliability, and quality . . . **but, at this new low price.**

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Mini Makes Light of Lamp Firm's Billing, Inventory

PLAINVIEW, N.Y. – Many companies today have trouble moving inventory and convincing customers to pay their bills on time.

But Quoizel, which turns out specialty lamps in a matter of days, rather than the industry norm of weeks, is doing better than ever. Delivery is so dependable that customers pay their bills on time just to maintain good credit standing, according to the firm.

The firm built its reputation on sound organization, good management and attention to detail, it said. And this is how it went about finding a small computer that would suit its business.

After talking with computer vendors for almost a year, Irene Seltzer, comptroller, suggested Quoizel purchase a Digital Equipment Corp. Datasystem 340.

Costing less than $45,000, the Datasystem performs a variety of functions, from order entry, billing and invoicing to accounts receivable and payable. It automatically handles inventory, sales analyses, commissioning and open purchase.

The company began working with computers in 1968, contracting with a service bureau to handle inventory control. The company progressed with great caution from inventory computerization to payroll, then accounts receivable and, finally, accounts payable.

Each function was given to a different service bureau to guard against problems at any one bureau.

Quoizel was ready for its own in-house DP system by 1972. Business had grown rapidly, and bills from the service bureaus were almost equal to the cost of a small business computer.

"We also felt we needed more management information on demand, and that would have increased the service bureau bills even more," Lionel Chaikin, Quoizel vice-president, said.

System Features

The system incorporates sensitive file protection, comprehensive audit trails and features that minimize the impact of malfunctions or power failures. Further, the system is designed for ease of use by nontechnical personnel.

The system speeds billing and reports on the status of orders from receipt through shipment. As lamp orders are received, they are typed into the mini which prints up a work order sheet with a number before each lamp. The number is coded specifying all components that go into the lamp.

Orders are printed in triplicate with a copy going to the picking department, shade department and prepack department. Each collects the materials necessary and sends them to the production department.

Prior to using the computer, a work order was typed and the order-picking manager would have to manually break out each lamp into its components.

The production crew of 20 people can assemble 1,000 lamps each day. Quoizel can promise order shipment from within a week to 10 days, instead of the usual six to eight weeks and keep a growing number of customers happy.

The system consists of a PDP-8/E minicomputer with 12K words of core memory, two RK05 disk units, each capable of storing 3.2M characters, a VT05 CRT terminal and a printer capable of producing 300 line/min. The minicomputer runs under the Commercial Operating System (COS-300) created by DEC using Dibol.

Software for the Quoizel system was supplied by Corstar Business Computing Co. of White Plains, N.Y.

Add-On Memory Fits DEC PDP-11s

BEVERLY HILLS, Calif. – An add-on core memory system specifically designed to be inserted directly into existing chassis slots of Digital Equipment Co.'s PDP-11 model computers is now in production by Litton Memory Products.

The Litton LM-1605 is a 16K-bit core memory system which is pin-compatible with the PDP-11/05, -11/10, -11/35, -11/40 and -11/45 computers.

It has all the features, including interleaving capability, needed to fully meet the operating requirements of these computer models, Litton said.

The LM-1605 occupies almost two slots in the computer chassis, requires less power to operate than standard DEC memories, is faster than DEC and most add-on memories and is often less than one-half the cost of DEC memories, Litton said.

The $2,500 LM-1605 has a cycle time of 900 nsec, an access time of 325 nsec and six edge type connectors of 36 pins each.

The firm can be reached through 360 N. Crescent Drive, 90210.

Key-to-Disk Unit With Cobol Solves Milk Agency Problem

(Continued from Page 31)

Cobol programs which are automatically called by a string of control statements, Murphy said.

And included in these statements are screen prompts which are used to indicate the program currently being run and to give operator instructions.

Video Feature

Four-Phase's Cobol includes a video feature that allows the Cobol program to accept data from the keyboard and display it on the screen without interruption of normal background processing.

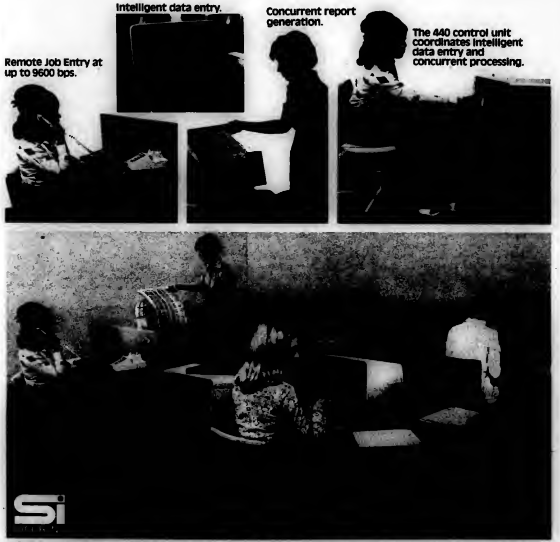
Use of this feature, according to Murphy, has reduced the number of programs by allowing options within a single program to be selected based on keyboard input at the time of processing.

In addition, variable data such as dates and values can be input at the time of program execution to gain flexibility with a standardized Cobol program.

The administrator's current data processing involves a relatively small amount of data input per month (fewer than 10,000 80-char. records), but the on-line file could easily double this volume.

Present processing, including backup of data, requires eight disk cartridges – two formatted for data entry and six formatted for Cobol operation. Half of these are used for backup files.

Announcing the new clustered data entry and with shared files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Mini Helps 'Grateful Dead' Compose Rock

SAN RAFAEL, Calif. – Associates of the Grateful Dead rock group, Ned Lagin and Phil Lesh, have released an electronic music composition produced with help from a minicomputer.

"Sesstones," a long-play album from Round Records, features music from an electronic keyboard instrument centered around an Interdata Model 7/16 minicomputer with a high-speed arithmetic logic unit.

The composition was written by 27-year-old Lagin, resident synthesizer/keyboardist for the Dead, one of the premier rock groups in the U.S.

Lagin, a graduate of the Massachusetts Institute of Technology, combined music and electronics to design a unique system for use in composition, live performance snd recording.

The music system now includes the minicomputer with 32K bytes of memory, a large analog synthesizer console, 16 digital-to-analog converters, polyphonic digital and analog keyboards, satellite microprocessor systems and interfaces.

Future plans include addition of a magnetic disk drive, CRT terminal and more memory with a possible upgrade to a 32-bit Interdata Model 7/32.

"The computer allows electronic synthesis and processing techniques to be stored and used in real-time," Lagin explained. "We hope this leads to organic, artificial, musical intelligence.

"This enables performance with formal changes on both macroscopic and microscopic levels at relative speeds," he continued. "Pitch, timber and rhythm time frames of reference can be used interchangeably in very complex relationships."

System Linked to Spectrographs Aids Analysis of Iron, Steel

PORT KEMBLA, Australia – A minicomputer linked with six spectrographs in a system improves analysis of samples in the central laboratory of Australian Iron and Steel Pty. Limited (ATS) here.

The extensive hookup is intended mainly to produce greater accuracy through the elimination of human error in the analysis of up to 13 different elements other than iron in iron and steel samples.

ATS requires the percentages of each element in the sample be accurate to within .0005%. A difference of .001% could be sufficiently drastic to force a stop of the process producing the product involved.

The computer was installed in November 1974, and the system became operational in February 1975 on a 24-hour-a-day basis.

Four of the six spectrographs are of the light emission kind, in which a beam is produced which is split into the characteristic wavelengths of the elements. Photomultipliers are used to measure the intensity of each wavelength.

The Data General Nova 1200 will receive the resultant raw values and make the necessary calculations for a printout giving the sample number, time of sampling, heading of elements and the percentages of the elements in the sample.

This phase of the spectroscopy will replace the use of a console and typewriter and the manual examination of charts to convert the raw output of the spectrographs into percentage values.

The computer will fulfill a similar role with the other two spectrographs, which use the X-ray fluorescent principle in analyzing materials such as slag, flue dust and sinter, in addition to iron and steel.

The Nova 1200, which has a 32K core store, will be linked through multiplexers with the six spectrographs and six terminals associated with the spectrographs.

Automation Achieved By Police Department In Just 14 Months

(Continued from Page 31)

ments.

The two operators record each pertinent item of radio traffic on the CRT, and the system automatically keeps track of the unit, the incident and the exact time of each transmission.

For each active officer involvement, the computer maintains the entire record in main memory for recall by the operators; for completed incidents, the records are transferred to a Wang disk storage device for later processing.

In addition to patrol and traffic reporting, the system also maintains complete dispatching and recordkeeping for the city's detective bureau, bailiffs, police supervisors, animal patrol officers and other law enforcement personnel.

Handling this two-way data flow is simplified by a series of special functions designed into the computers' software system.

By depressing a key, the operator can call to the screen instantly any one of nine special formats that enable him to capture every pertinent fact relative to each complaint.

Last May – one year after the initial decision to automate its recordkeeping – the department completed development of an on-line data transmission line between the Wang computers at police headquarters and the Burroughs 1700 computer at City Hall. The B1700 is used by the city to process in a batch mode all the detailed statistics accumulated by the dispatching system.

Previously, these statistics were printed at the dispatching center and sent each day by courier to City Hall for keypunching and entry into the B1700. Now, the data transfer takes place right from the Wang disk drive, on-line through a 1,200 bit/sec telephone connection, to the B1700 disk drive, where it is transferred to magnetic tape for backup record purposes, and to the main processor for processing into finished management and statistical reports.

By moving into an on-line status, the police department has cut from four workdays to a single day the turnaround time for documents and reports needed for detailed management analysis and feedback into federal and state crime information networks.

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Shared file access.

The 440 system lets you share and access files locally, reducing investments in telephone communications and central CPU resources.

Data entry made easy. Now each operator, at her own display, can make use of current data in shared files to support data entry functions. For reduced keystrokes and lower error rates.

Inquiry/Response. File look-up is made simple with up-to-date information on-site, using the 440's own file management and disk storage capabilities.

System modularity.

Design your own system with a variety of options and peripherals.

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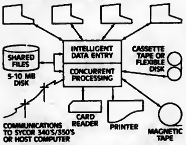

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There's full software compatibility with our Model 340 and 350 stand-alone terminals. Keyboard and operations are also compatible.

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Concurrent processing.

And best of all, while data entry is being performed in the foreground, you can be doing other jobs concurrently in the background. Jobs that can save you time and money. Jobs like:

Remote job entry. Use the 440 with its card reader and 300 LPM printer for large-scale remote job entry. And since the system contains a CRT and a keyboard, you don't pay extra for them.

Multi-terminal printer support. Each display can interleave print data to one printer as the data is being entered. So, you don't need a separate printer for each display.

Report generation. Sycor prepackaged programs let you produce all sorts of management reports—sales analysis, inventory, or billing—at the same time as you are performing data entry.

File maintenance. And the Sycor 440 allows you to do editing, sorting, up-dating, and file transfer in a background operation.

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COMPUTER INDUSTRY

CI Notes

Committee to Save Disc Formed, Represents 300

WASHINGTON, D.C. – A Special Committee for U.S. Exports has been formed to save the domestic international sales corporation (Disc) program. The committee represents about 300 firms, including several DP companies.

Under the Disc program, which has been attacked as a tax loophole and a revenue drain, companiea that sell domestically produced goods overseas through a Disc may defer federal taxes on 50% of those sales indefinitely [CW, July 23].

The committee will be responsible for improving public understanding of the effectiveness of Discs in creating U.S. jobs and increased exports, cooperating with congressional staffs and committees to develop information on export incentives and monitoring legislative, administrative and judicial developments relating to such incentives.

Comsat General Bids To Increase Share in CML

WASHINGTON, D.C. – Comsat General Corp. has offered co-owners MCI Communications Corp. and Lockheed Aircraft Corp. from $1.5 million to $2.5 million each for their shares of CML Satellite Corp. in a move to temporarily consolidate its ownership.

CML was established in 1972 by Comsat General, MCI and Lockheed. Last year, when Comsat General and IBM offered to take over CML, the Federal Communications Commission blocked the move temporarily by establishing certain conditions for CML's ownership and operation.

IBM and Comsat General indicated they intend to comply with the stipulations by bringing in a third partner, as yet unidentified.

Bunker Ramo to Sell Nasdaq

OAK BROOK, Ill. – Bunker Ramo Corp. has agreed in principle to sell its National Association of Securities Dealers Automatic Quotation (Nasdaq) system to the National Association of Securities Dealers (NASD) for about $10 million.

The sale would occur during the first quarter of 1976, Bunker Ramo said.

The company built the system, located in Trumbull, Conn., for NASD in 1971 and owns the hardware. NASD supplies the system's policies and enforces its rules.

Bunker Ramo and NASD have begun arrangements on a four-year contract under which Bunker Ramo would continue to operate the system, the company said. The current contract between the two organizations expires in February.

West Coast DP Firms Say

Worst of 1974-75 Recession Blown Over

By E. Drake Lundell Jr.
Of the CW Staff

The worst of the recession is over, marketing men and other executives at more than a dozen West Coast computer companies agreed recently.

The recession pretty much hit botton in the first quarter, the executives said, and in general has not been as severe in the computer industry as in the general economy.

Furthermore, several of the companies saw little effect of the recession on their business, and most of the firms affected by the general downturn in the economy indicated they experienced flattening in the order rate rather than a drop per se.

At Ball Computer Products, Larry Dorie, national sales manager, noted the first five months were essentially flat when compared with last year, but that an upturn started at the end of May and continued through June.

For the year, he said, the firm is predicting "some growth, maybe 20%."

One reason for the flat start was probably a result of the recession – few very large original equipment manufacturer (OEM) deals were brewing during that time of economic uncertainty, he said.

In particular, when Cummings decided not to market its combination OCR and key-to-disk system, Ball, which would have supplied the OCR portion, felt the effects.

At Diablo, a Xerox Division, Charles Ryel, national marketing manager, said that firm hit the bottom in the first quarter, when its production rate was cut in half from the high point reached last fall.

OEM Supplier's Problem

One of the problems for an OEM supplier such as Diablo, he said, is forecasting the market, since an OEM supplier is by nature a step or two removed from the marketplace for its final products.

The printer market, he said, stabilized in March, even though it was not nearly back to its high point, reached last fall. For the year, he said, Diablo expects the market to get back to its previous high levels.

In the disk market, production dropped from a high of 1,100 units monthly to a low of around 600, he said, but it will probably be back to the previous level by the end of the year.

One of the reasons for the dip, Ryel said, is that many OEMs have been living off their equipment inventories and therefore not placing new orders.

This is changing, he indicated, with delivery dates now between three and four months after order.

While this year will be devoted to regaining previous production levels, Ryel predicted next year will show substantial increases in the business over the highs of last year.

At International Terminals Corp., the bottom came last fall when orders were somewhat flat, but they have picked up since then, J. Reid Anderson, president, said. The effects of the recession have hardly been felt by the firm, he added.

Memorex has already "paid its dues," according to John Hoiness, that company's director of product marketing. It has not felt the effects of the recession and, in fact, posted record revenues during the last six months.

One reason is that Memorex has built up a lease base which is now paying off, he said, even though it contributed to some of the company's earlier problems.

At Data Disc, the firm is seeing a lot of activity now, primarily because new products are coming on line to alleviate any slack that might have been felt from the general economic conditions, according to Esmond Lyons, vice-president for marketing.

At Gen-Com Systems, Inc., President William Chamberlain said the venture capital market had been difficult for startup companies, which caused the firm to "bootstrap" its startup from the resources of the founders.

However, this forced the firm to do certain things that have been advantageous, he said. For example, it has had to establish its own lines of credit and finance leases itself, giving it better control over the market and enabling it to offer flexible lease rates to users.

In a firm like Pertec, the balance between the component and systems business has helped prevent overall downturns for the company, according to President Ryal Poppa, who noted that, when one segment seems to have a slight downturn, the other part picks up.

During the first quarter of this year, for example, the tape and disk market was essentially flat, he said, but at the same time the Business Systems Division doubled its business, more than taking up that slack.

Dealers See IBM Price Changes Boosting Used System/3 Market

By Nancy French
Of the CW Staff

Used IBM System/3 equipment is bringing 60% of current IBM retail prices, a survey of dealers has shown.

Anticipating an increase in the number of used System/3s moving onto the market, dealers predicted the sales of these systems will be as lucrative in three years as used 360s are today.

But the used market in System/3s, dealers agreed, has developed very slowly – only about 2% of users have purchased their systems, they said.

Past IBM pricing "has not encouraged purchasing because maintenance costs are too high," Bill Grinker, vice-president of American Used Computer, said.

The monthly installment payment, coupled with a high monthly maintenance charge, costs the user more than IBM rental, according to George Akin, vice-president of sales for TLW Computer Industries, Inc., an Atlanta-based company.

But IBM's recent 15% reduction in the purchase price of the System/3 should change that, traders said.

Jack Goodman, vice-president of Econocom, Inc., a Memphis-based firm, said IBM'a recent price change "has put buying in a lot of users' minds, and when they consider buying, they call the used vendors to see if they can get a better deal than IBM's."

IBM's price cut will allow many users to apply their purchase options to cover the entire down payment for their systems. In addition, IBM's offer to finance the balance at 1.5% over the prime interest rate should make purchasing a good decision for a lot of users, he said.

These are the systems that will end up on the used market in about three years, Goodman said.

The demand for used System/3s is greatest among 1401 users who are looking for more flexible low-cost systems and present System/3 users who are looking for a better price, according to Glen Walden, president of Computer Wholesale Corp., a company that buys batches of IBM equipment for resale to other dealers and leasing companies.

"Our biggest activity has been among service bureaus that are presently leasing System/3s," Walden said.

Ironically, there are actually fewer used machines available at the moment than there would normally be because the value of System/3s has gone down, and users who might have sold a few months ago aren't willing to accept lower prices for their systems, explained Ron Baker, vice-president of CMI in Detroit.

Baker described this as a short-term "emotional" reaction and predicted it

(Continued on Page 36)

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HP Reorganization Creates Two Units

CUPERTINO, Calif. – The latest reorganization at Hewlett-Packard Co. (HP) has created two new divisions out of the Computer Systems Group's Data Systems Division: General Systems and Terminal Products.

Paul C. Ely Jr., general manager of the Computer Systems Group, said "the success of the HP-3000 mini data center system and the HP-2640 CRT terminal has greatly increased our opportunities.

"The new organization will enable us to concentrate more management attention on these products, as well as on our more traditional industrial, scientific and OEM areas.

The General Systems Division is headed by general manager Ed McCracken, formerly marketing manager for the Data Systems Division. Bill Krause is marketing manager.

The division is responsible for the HP-3000 systems and HP-2000 Access systems with emphasis on business and educational applications.

The Terminal Products Division, which will handle the 2640 and other future terminal and terminal I/O products, is headed by James Arthur, formerly general manager of the company's corporate service organization.

Ed Hayes, who was in charge of marketing the 2640 under the Data Systems Division, is marketing manager.

Dick Anderson remains as manager of the Data Systems Division, which will handle the 21MX and the 9600 line of industrial products as well as the 7900 disk product and other future disks, serving the industrial and OEM markets.

Ted Doyle, who was sales development manager, has been named Data Systems' marketing manager.

By Nov. 1, the General Systems Division will be located in facilities in Santa Clara. The Terminal Products Division is expected to relocate in 1976.

Although each division will have an R&D lab, the Data Systems Division retains the lab working on LSI development and other products now in the works. Bob Kadarauch, who guided the 2640 out of the laboratory, remains as marketing arm for this laboratory.

Inexperience Stymies Negotiations On East-West Trade Deals: Klages

GENEVA, Switzerland – Many of the problems encountered in East-West trade negotiations are the result of the inexperience of the principals in dealing with one another, as well as fundamental differences in methods, objectives and philosophies of doing business, Robert D. Klages, vice-president and general counsel of Univac, told a meeting of the Economic Commission for Europe.

Klages called for the "increased use of educational seminars and conferences which explore the attitudes of both sides and attempt to being divergent philosophies and means of doing business into closer harmony and understanding.

"We also need to develop, perhaps under the auspices of the Economic Commission for Europe, models of successful East-West industrial relationships which could serve to facilitate the entry of smaller Western firms into this complex business environment," he said.

Continuing efforts should be made on both sides to decrease the burdensome bureaucratic delays which impede the flow of East-West trade," he added.

Market to Open For Used S/3s

(Continued from Page 35)

would pass.

In the meantime, many used equipment dealers don't want to handle the System/3s yet because they are not profitable enough.

"We're going to get into System/3s when we feel they're more stabilized and there's a more consistent wholesale market," Walden said.

"There are too many problems involved in selling used machines to end users, especially in customizing systems," he explained.

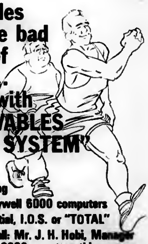
The System/3, which takes just as much effort to sell as a 360, produces a much smaller profit, Walden said, and "when you have to buy missing parts from IBM and customize systems for end users, there isn't enough left to make System/3 sales worthwhile for us."

CSC Agrees to Extend Infonet to Spain

MADRID – Computer Sciences Corp. (CSC) plans to extend its Infonet service to Spain through an agreement with Entel-Ibermatica, a DP services subsidiary of the National Telephone Co. of Spain.

The agreement, subject to approval of the Spanish government, provides for a monthly utilization fee and covers a 10-year period.

CSC will provide the Infonet operating system and library of programs, as well as training of the Spanish firm's personnel.



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We've selected leading experts from around the country to guide each of our Seminars. They are highly accomplished specialists in their fields, experienced in presenting their techniques to industry and management. If you're involved in one of the areas shown, you should attend the EDP Seminar Series this fall. What you learn will benefit your company, your installation, and you.

Data Communications Course #1010 —Practical Data Communications Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two-day seminar on the newest advances in data communications. The course covers areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of Satellite Carriers.

Total Cost, including workbook, reference materials luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for the reduced rate of $300.

San Diego	**Plaza Int'l Hotel**	**Sept. 29-30**
New York	**St. Moritz**	**Oct. 13-14**
San Francisco	**Dunfey's Royal Coach**	**Oct. 20-21**
Miami	**Hyatt Miami Beach**	**Nov. 17-18**

Data Communications Course #1020 —Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications networks. This three-day seminar covers procedures, approaches, and algorithms for evaluating and cost-optimizing network operations.

Total cost, including an extensive set of customized course materials, is $450. Additional registrants from the same company qualify for a reduced rate of $400.

Miami	**Four Ambassadors (Sheraton)**	**Dec. 1-3**

Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N. Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this 2½-day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is $325. Additional registrants from the same company are charged only $275.

New York	**Summit Hotel**	**Oct. 22-24**
San Francisco	**Hyatt Regency San Francisco**	**Nov. 12-14**
Chicago	**Hyatt Regency O'Hare**	**Nov. 19-21**

How to Draft Effective Legal Agreements

This one-day seminar is a complete workshop for non-legal, technical people who may be called upon to draft legal agreements for their company. Also led by Roy Freed, this seminar covers a variety of formal agreements, their structure and the legal factors involved. You'll have all the basic skills necessary to write legal agreements, and you'll be able to spot items that really require the attention of lawyers.

Cost for the seminar, including luncheon and a complete workbook on the subject, is $135.

New York	**St. Moritz**	**Oct. 8**
Boston	**Sheraton**	**Oct. 15**

Data Base Design

Given in association with Leo J. Cohen and Performance Development Corporation, this three-day seminar is a package-independent examination of the techniques required for the design of effective data base systems. The seminar covers Effective Record Design, Physical Storage Techniques, Optimum File Organization/Indexing Techniques, File Integration, and much more.

Cost for the seminar, including course materials, continental breakfasts and luncheons is $350. Additional registrants from the same company qualify for a reduced rate of $300.

New York	**St. Moritz**	**Sept. 22-24**
Denver	**Denver Hilton**	**Dec. 1-3**

Performance Evaluation and Improvement

Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement, and improvement* will lead this two-day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Realtime, Batch and interactive time sharing systems.

Cost for the seminar, including continental breakfasts and luncheons and all course materials is $250.

New York	**Summit Hotel**	**Sept. 29-30**
Wash., D.C.	**Marriott at Wash. Int'l. Airport**	**Oct. 20-21**
Chicago	**Hyatt Regency O'Hare**	**Oct. 27-28**
San Francisco	**Dunfey's Royal Coach**	**Jan. 19-20**

How to Increase Programming Productivity

John W. Brackett, PhD, Vice President of SofTech, Inc., will lead this two-day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation; and Chief Programmer teams. Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is $300. Additional registrants from the same company are charged only $250.

New York	**St. Moritz**	**Oct. 6-7**
San Francisco	**Berkeley Marriott**	**Nov. 10-11**

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Investment House Predicts

Only IBM, Burroughs to Survive in Mainframe Arena

By E. Drake Lundell Jr.
Of the CW Staff

LOS ANGELES – "All of the world's mainframe competitors with the exception of IBM and Burroughs may be faced with the need to withdraw from the industry," according to a report from New York Stock Exchange member Shearson Hayden Stone, Inc.

The study also concluded that "IBM, under pressure of outside technological developments and internal revenue requirements, must announce new hardware in the 1976-77 time frame."

The effect of this "on the already dangerously weak competition could be considerable," the report added.

"Computers remain one of the most dynamic growth industries for investment today," the report noted, but warned the pace of technological development is more rapid "than ever before.

"As a result, the computer manufacturer is faced with a far more difficult business environment" than in the past, according to the study.

"The allowable margins for error have been reduced almost completely. In short, participation in the computer industry today requires astute, forward-looking management as well as substantial cash flow and profit margins.

"Anything less leads to a weakened product structure in the marketplace, insufficient production volume to operate efficiently and, finally, financial inability to keep pace with technological progress," the report added.

All of the competitors in the mainframe business – with the lone exception of Burroughs – have committed one of three errors, the report said.

"These consist of concentration on too narrow a product range, maintaining an overage technology and persisting with an irrational (i.e., noncompatible) product line.

"As customers react to these defects, management tends to take the defensive posture of preserving the existing customer base through price cutting and avoiding the aggressive and risky marketing required to acquire new users or enter new product areas.

"As a result," the study said, "profit margins and cash flow are impacted, rendering the company incapable of rectifying product weakness because the required capital is unavailable or the risk is too great for the company's financial condition."

In general, the report pointed out, only IBM and Burroughs have profit margins that are in the double figures. In 1974, for example, IBM had a profit margin of 27.1% and Burroughs showed a margin of 16.7%, while Sperry Univac showed 4.2% and NCR 7.7%.

In 1973 Honeywell had a 4% profit margin and Control Data Corp. had a 3.2% margin in the computer area.

The picture is much the same in the return on assets area, the report said. claiming IBM showed a 22.1% rate in 1974 while Burroughs had a 16.1% rate, Sperry Univac a 6.5% rate and NCR an 11% rate.

In 1973 the rate for Honeywell was 2.9% and for CDC 3.8%, the report noted.

Honeywell's problems have been due primarily to its compounding "an irrational product line by absorbing the noncompatible product line of another manufacturer and then allowing the combined product technology to age unreasonably," the report said.

"The company's new product line is principally a version of its most successful older line . . . Since it offers little to the customer, the company is forced to maintain both old and new lines and higher costs coupled with departing customers placed the company in the red.

"At this time there appears to be little potential for a solution to the problem," it added.

CDC on other other hand, concentrated on too narrow a range of computer equipment in the scientific market, which has sharply decreased over the past few years, the report said.

"The only option that we see open to the company is a departure from the mainframe computer industry and concentration of the services and peripherals area of the business," the report said, adding however that "with advancing technology, the peripheral business will also face increasing risk."

NCR also concentrated, but in the smaller systems market. With a concentration in the point-of-sale (POS) area, the firm is competing not only with the traditional mainframers, but also with a host of newcomers, the report said.

"Technology will evolve the data input, POS equipment into low-cost, high-volume, low profit margin devices with the most of the logical operations pushed back into the computer, the area in which NCR is weakest," the report predicted.

"Sperry Rand also has an irrational product line and has absorbed the product line of another manufacturer," the report said, adding that "its technology has been allowed to age excessively."

While the situation has not become severe for the firm, "the initial steps of concentrating on the existing customer base and cutting prices have been taken. Profit margins and cash flow in the customer area are too low to be comfortable in a high technology industry," the report said.

"Increased revenues and earnings are being obtained, but there is insufficient capital available to take the steps toward product improvement required for survival," it added.

IBM Contributes Equipment

ATLANTA – IBM has contributed two computers, keypunch machines and a variety of office machines to the newly opened Atlanta Urban League Training Center, a facility designed to train the unemployed and underemployed.

The donation includes a System/3 Model 10, a 370/125, 20 keypunch machines and 22 electric typewriters.

IBM is also providing five professionals to help staff the center.

Photophysics Found Not Guilty of Charges Brought by Varian

MOUNTAIN VIEW, Calif. – Photophysics, Inc., a manufacturer of electrophotographic products, was vindicated on July 29 by the judgment of the U.S. District Court in San Francisco with respect to all charges filed against it by Varian Associates.

Photophysics, founded in 1969 by four ex-employees of Varian, had been charged with unlawfully appropriating confidential technology and marketing information and with infringement of four patents.

The court held that Photophysics did not use Varian technology, did not infringe three of the four patents and that the fourth patent was invalid.

Judge Samuel Conti also disallowed Photophysics' antitrust claims, stating that Photophysics, although affected by Varian's action, could not construe these damages as justifiable antitrust claims.

Commenting on the judgment, Photophyics President Dallas Talley said, "We will now be able to complete the capitalization program initiated well before the lawsuit and continue development of our existing and associated electrophotographic technologies.

"Letters of intent, working agreements and pending orders totaling between $3 million and $5 million for the sale of our products in the U.S., Japan and Iran should now be confirmed."

Varian Charges

Varian claimed Photophysics used electrophotographic and electromechanical technology developed by Dr. Ivor Brodie, Jack Mooney, Dr. John Dahlquist and Dr. Guy Marlor while they worked at Varian.

These technologies and concepts, used in Photophysics Quantafax "instant hard copy" method of reproducing video data, infringed Varian patents, Varian alleged.

Varian had asked all Photophysics patents in the subject area revert to Varian under a constructive trust, that reasonable royalties be paid by Photophysics on past and future sales and that Photophysics be enjoined against developing products using these technologies for two years.

Varian also asked that Photophysics be restrained from disclosing technical information to Hewlett-Packard Co., its licensee.

Conti ruled Photophysics had used entirely different photochemical approaches to electrophotographic energy conversion, and the electromechanical concept and electrical approaches (roller-fed paper and conductive foam/rubber substrates) were all prior art available from more than one supplier on the open market.

He also ruled Photophysics had not used Varian trade secrets, and the statute of limitations for such violations had already expired prior to Varian's initiation of its complaint against Photophysics.

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Ball has just announced a new line of disk controllers for Interdata Model 70, 74 and 7/16 mainframes. The new controllers have their own selector channel, and feature a built-in micro-programmable processor (designed and built by Ball, naturally) which permits us to program your controller to get more out of your hardware and software (answering the digital question, "Which costs less—smart programmers or smart controllers?").

These are probably the most sophisticated controllers ever designed—they support overlapped seeking, read-before-write, individual sector write protect an automatic data verification.

And yes, Va., they still fit in a single I/O slot inside the mainframe.

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On Teleprocessing Contracts

Adapso Advises GSA to Alter Proposal

MONTVALE, N.J. – Although the Association of Data Processing Service Organizations (Adapso) concurs with the General Services Administration's (GSA) move to award contracts to private teleprocessing companies, many aspects of the proposal should be changed, the organization said.

In a letter to GSA's commissioner of Automated Data and Telecommunications Services, Theodore D. Puckorius, Adapso executive vice-president Jerry Dreyer said the proposal should be altered "in order to provide both the government and the various teleprocessing firms with a fair and equitable business arrangement."

Within the discounted benchmark requirement [CW, July 30], Adapso objects to the requirement that all discounted schedules in a given category from qualified vendors be averaged in order to determine a point from which to begin negotiations.

"No reasonable discount schedule offered in good faith should be subject to further negotiation," Dreyer said.

In explaining why the discount benchmark is inappropriate for teleprocessing services, Adapso said the "network information services our members offer do not contain the common cost categories and easily measurable characteristics of normal procurements . . . . Each vendor structures his operating system and costs for use of the system significantly different from the next vendor."

In addition, the GSA proposal "fails to take into account the basic institution of discount policies within companies." The pricing policies of individual firms are unique, based on the services they offer, he added.

Monopoly Could Result

The GSA plan could lead to a monopoly situation, Dreyer said. "Should the GSA price adjustment clause be a guideline, the initial price leader will become the volume leader and thus eliminate competition. This entire process could lead to a monopoly within a short span of time, where one vendor can fix prices and dictate market conditions," he wrote Puckorius.

Dreyer predicted that the discount benchmark policy would cause some vendors to suffer severe losses and others to earn huge profits because the policy is so "inconsistent and foreign to them."

He suggested an alternative method of bidding: the GSA should "allow each contractor to set down his prices and discounts and let each agency carefully examine these costs to find the lowest total price for a specific job."

Adapso also objected to allowing competition from nonprofit organizations such as universities. "Not only are these organizations nontaxpaying but, because of this, their prices can be substantially lower since they do not have to compile taxes as a fixed cost."

The association of time-sharing and service companies also took exception to the guidelines concerning operational growth.

The specifications require contractors to indicate a growth plan commitment not less than 10% a month of these resources until government needs are satisfied or the vendor has reached the maximum dollar amount of business it's willing to accept.

"We do not believe any vendor should be forced to incur costs and establish facilities without fully understanding revenue potential derived from the expansion," Dreyer said in his letter.

Other aspects of the proposal to which Adapso objects include clauses that assess liquidated damages, prevent the vendor from declining orders and require notification to the user agencies of changes in networks, applications, software and hardware.

Adapso called unreasonable and unrealistic GSA's plan to prevent price adjustments for three years.

Mira-Pak, IBM Settle

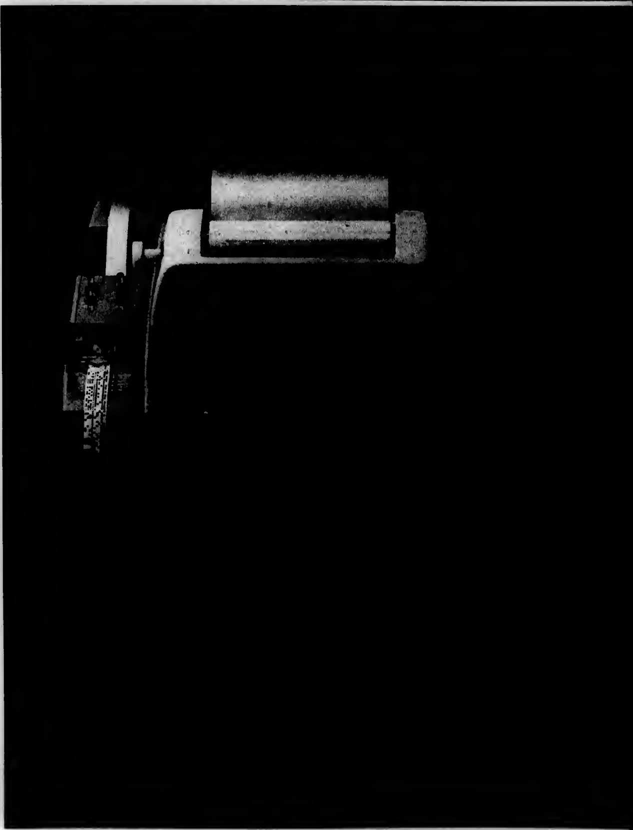
HOUSTON – Mira-Pak, Inc. and IBM have dropped lawsuits against each other, decreasing by one the number of antitrust suits IBM faces.

Mira-Pak, maker of a computer system used by the food processing industry, charged IBM was seeking "to extend its monopoly to the package processing needs of certain segments of the food processing industry" [CW, June 27, 1973].

Mira-Pak claimed its sales had been drastically decreased as a result of IBM's "anticompetitive" acts.

In its suit against Mira-Pak, IBM charged Mira-Pak with unfair competition and claimed three of Mira-Pak's patents were invalid and not infringed.

Under terms of the settlements, Mira-Pak withdrew its antitrust suit, and IBM withdrew its counterclaim and declaratory judgment action. IBM agreed to pay $500,000 for Mira-Pak's litigation expenses.



IBM Canada Halts Political Gifts

ARMONK, N.Y. – In keeping with a single, worldwide IBM policy on political contributions, IBM Canada Ltd. has halted "its customary and legal practice" of contributing to Canadian political parties and candidates.

In a letter to shareholders, Frank T. Cary, IBM chairman, said IBM Canada's directors "believe political contributions by Canadian companies in support of the Canadian political process, and in accordance with Canadian laws, are appropriate.

"However, they have concluded that it is important to have a single worldwide IBM policy on this matter. . . ."

Cary had told stockholders at the annual meeting that IBM policy forbids political contributions. "At that time, I didn't know that IBM Canada Ltd. was an exception," he said in his letter.

The Canadian unit's contributions to federal parties totaled $62,000 in 1974 and $10,000 in 1975.

Maisonrouge Says

'IBM Builds Responsible Subsidiaries'

LA HULPE, Belgium – "IBM builds responsible subsidiaries," Jacques Maisonrouge, chairman of IBM World Trade, said on the occasion of the inauguration of a new center here.

Maisonrouge, in a departure from his usual reticence, commented on IBM's management plan, according to a report in the French publication, *Zero-Un Informatique*.

"Our management system depends on two postulates," he said. "Our products, we think first of all, correspond to demands more or less identical throughout the world. . .That is why we made, some time ago, the decision to have a single product line for the whole world."

While IBM's technological development effort is therefore global in span, each country has its say and a role to play in each new development, Maisonrouge added.

"Our second postulate is that we are a payee in the economy and the industry of each of the countries in which we operate," he said.

"Thus, IBM could not be compared to a monolithic giant whose brain is situated in Armonk [N.Y.].

"Rather, it is a question of a whole, comprised of complete and independent industrial organizations which have, nevertheless, a single product line as well as certain standards and practices," the IBM executive said.

"We have to find a balance point between a necessary unity and a legitimate autonomy. That is the key management problem at IBM," Maisonrouge said.

"One of the essential tasks of an international enterprise is to pull out the best possible part of its international resources. Only then can we be sure that no one country will be favored when it comes to making a global decision," he said.

To accomplish this task, IBM has instituted a long-term plan which covers all functions of the enterprise, he said.

"This plan is obviously not to be compared with a list of commandments inscribed on a stone tablet in Armonk," Maisonrouge said.

To understand the process by which a decision is made in a company such as IBM, three levels must be identified, he said – the global level, the continental or regional level and the national level.

"In summary, our management strategy consists of building strong, efficient, responsible national subsidiaries; in sustaining them by building up international policies and lines of conduct; and in furnishing technological effort on a worldwide scale which will allow them to respond to the needs of their clients," Maisonrouge concluded.

Foreign Orders & Installations

Top Ten Promotions Ltd. in Bristol, England, has ordered a Univac 90/30 to compute the weekly winners of the Spastics Pool, which raises funds for charity through wagers placed on soccer games.

Two Brazilian universities, the Federal University of Rio de Janeiro and the Federal University of Minas Gerais, each have ordered a Burroughs B6700.

Indonesia's Ministry of Defense has ordered three GCS 2100 key-to-disk systems from General Computer Systems, Inc.

Panorama, a department store in Mehring, Bavaria, has installed eight NCR 255 terminals linked to an NCR 726 minicomputer.

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On Teleprocessing Contracts

Adapso Advises GSA to Alter Proposal

MONTVALE, N.J. – Although the Association of Data Processing Service Organizations (Adapso) concurs with the General Services Administration's (GSA) move to award contracts to private teleprocessing companies, many aspects of the proposal should be changed, the organization said

In a letter to GSA's commissioner of Automated Data and Telecommunications Services, Theodore D Puckorius, Adapso executive vice-president Jerry Dreyer said the proposal should be altered "in order to provide both the government and the various teleprocessing firms with a fair and equitable business arrangement."

Within the discounted benchmark requirement [CW, July 30], Adapso objects to the requirement that all discounted schedules in a given category from qualified vendors be averaged in order to determine a point from which to begin negotiations

"No reasonable discount schedule offered in good faith should be subject to further negotiation," Dreyer said

In explaining why the discount benchmark is inappropriate for teleprocessing services, Adapso said the "network information services our members offer do not contain the common cost categories and easily measurable characteristics of normal procurements . . Each vendor structures his operating system and costs for use of the system significantly different from the next vendor."

In addition, the GSA proposal "fails to take into account the basic institution of discount policies within companies" The pricing policies of individual firms are unique, based on the services they offer, he added.

Monopoly Could Result

The GSA plan could lead to a monopoly situation, Dreyer said "Should the GSA price adjustment clause be a guideline, the initial price leader will become the volume leader and thus eliminate competition This entire process could lead to a monopoly within a short span of time, where one vendor can fix prices and dictate market conditions," he wrote Puckorius.

Dreyer predicted that the discount benchmark policy would cause some vendors to suffer severe losses and others to earn huge profits because the policy is so "inconsistent and foreign to them."

He suggested an alternative method of bidding: the GSA should "allow each contractor to set down his prices and discounts and let each agency carefully examine these costs to find the lowest total price for a specific job."

Adapso also objected to allowing competition from nonprofit organizations such as universities. "Not only are these organizations nontaxpaying but, because of this, their prices can be substantially lower since they do not have to compile taxes as a fixed cost."

The association of time-sharing and service companies also took exception to the guidelines concerning operational growth.

The specifications require contractors to indicate a growth plan commitment not less than 10% a month of these resources until government needs are satisfied or the vendor has reached the maximum dollar amount of business it's willing to accept.

"We do not believe any vendor should be forced to incur costs and establish facilities without fully understanding revenue potential derived from the expansion," Dreyer said in his letter.

Other aspects of the proposal to which Adapso objects include clauses that assess liquidated damages, prevent the vendor from declining orders and require notification to the user agencies of changes in networks, applications, software and hardware.

Adapso called unreasonable and unrealistic GSA's plan to prevent price adjustments for three years.

Mira-Pak, IBM Settle

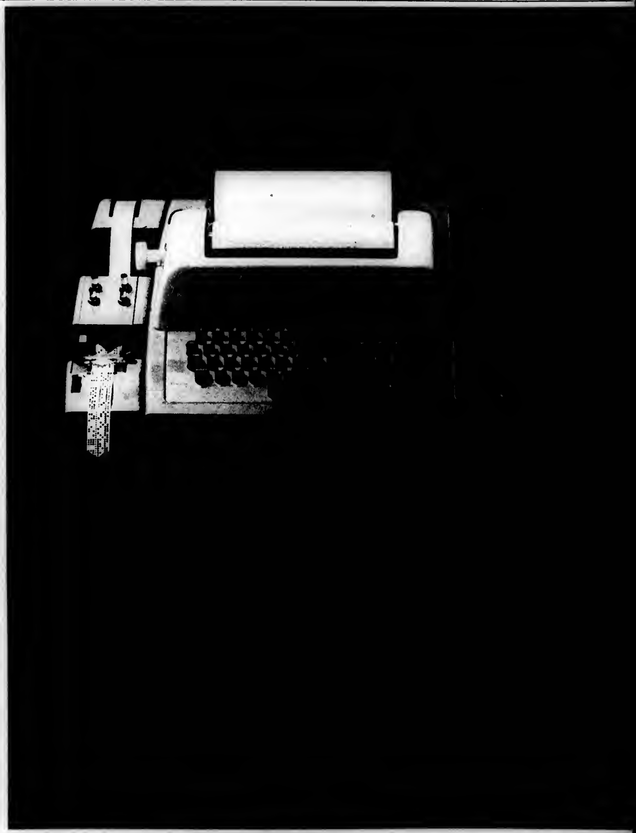
HOUSTON – Mira-Pak, Inc. and IBM have dropped lawsuits against each other, decreasing by one the number of antitrust suits IBM faces.

Mira-Pak, maker of a computer system used by the food processing industry, charged IBM was seeking "to extend its monopoly to the package processing needs of certain segments of the food processing industry" [CW, June 27, 1973].

Mira-Pak claimed its sales had been drastically decreased as a result of IBM's "anticompetitive" acts.

In its suit against Mira-Pak, IBM charged Mira-Pak with unfair competition and claimed three of Mira-Pak's patents were invalid and not infringed.

Under terms of the settlements, Mira-Pak withdrew its antitrust suit, and IBM withdrew its counterclaim and declaratory judgment action. IBM agreed to pay $500,000 for Mira-Pak's litigation expenses.



IBM Canada Halts Political Gifts

ARMONK, N.Y. – In keeping with a single, worldwide IBM policy on political contributions, IBM Canada Ltd. has halted "its customary and legal practice" of contributing to Canadian political parties and candidates.

In a letter to shareholders, Frank T. Cary, IBM chairman, said IBM Canada's directors "believe political contributions by Canadian companies in support of the Canadian political process, and in accordance with Canadian laws, are appropriate.

"However, they have concluded that it is important to have a single worldwide IBM policy on this matter. . . ."

Cary had told stockholders at the annual meeting that IBM policy forbids political contributions. "At that time, I didn't know that IBM Canada Ltd. was an exception," he said in his letter.

The Canadian unit's contributions to federal parties totaled $62,000 in 1974 and $10,000 in 1975.

Maisonrouge Says

'IBM Builds Responsible Subsidiaries'

LA HULPE, Belgium – "IBM builds responsible subsidiaries," Jacques Maisonrouge, chairman of IBM World Trade, said on the occasion of the inauguration of a new center here.

Maisonrouge, in a departure from his usual reticence, commented on IBM's management plan, according to a report in the French publication, *Zero-Un Informatique*.

"Our management system depends on two postulates," he said. "Our products, we think first of all, correspond to demands more or less identical throughout the world. . .That is why we made, some time ago, the decision to have a single product line for the whole world."

While IBM's technological development effort is therefore global in span, each country has its say and a role to play in each new development, Maisonrouge added.

"Our second postulate is that we are a payee in the economy and the industry of each of the countries in which we operate," he said.

International News

"Thus, IBM could not be compared to a monolithic giant whose brain is situated in Armonk [N.Y.].

"Rather, it is a question of a whole, comprised of complete and independent industrial organizations which have, nevertheless, a single product line as well as certain standards and practices," the IBM executive said.

"We have to find a balance point between a necessary unity and a legitimate autonomy. That is the key management problem at IBM," Maisonrouge said.

"One of the essential tasks of an international enterprise is to pull out the best possible part of its international resources. Only then can we be sure that no one country will be favored when it comes to making a global decision," he said.

To accomplish this task, IBM has instituted a long-term plan which covers all functions of the enterprise, he said.

"This plan is obviously not to be compared with a list of commandments inscribed on a stone tablet in Armonk," Maisonrouge said.

To understand the process by which a decision is made in a company such as IBM, three levels must be identified, he said the global level, the continental or regional level and the national level.

"In summary, our management strategy consists of building strong, efficient, responsible national subsidiaries, in sustaining them by building up international policies and lines of conduct; and in furnishing technological effort on a worldwide scale which will allow them to respond to the needs of their clients," Maisonrouge concluded.

Foreign Orders & Installations

Top Ten Promotions Ltd. in Bristol, England, has ordered a Univac 90/30 to compute the weekly winners of the Spastics Pool, which raises funds for charity through wagers placed on soccer games.

Two Brazilian universities, the Federal University of Rio de Janeiro and the Federal University of Minas Gerais, each have ordered a Burroughs B6700.

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Xerox 'Caught in Squeeze'

Mini, Mainframe Maker Gap Closing

OCEANPORT, N.J. – With the mini manufacturers making increasingly larger machines and the major mainframe manufacturers extending the lower ends of their lines, Xerox Corp. may have been caught in the squeeze, observed Bill Sweet, 32-bit product manager of Interdata Corp.

The mini makers utilize their large volume shipments of other units to bring down the unit cost of their larger machines, he said, noting many of the Interdata 8/32's components are also used in other Interdata machines.

Interdata was not specifically going after the same base as the Xerox 550, he said, but the market did overlap, especially in those instances where there was a need for a lot of number crunching with standard software.

The 8/32 has a faster execution time than the 550 and offered more memory until the latest Xerox memory upgrade, but doesn't have as many input/output facilities, he said.

On the other hand, the larger mainframe makers are well equipped to offer custom software as well as extensive number crunching and support and are penetrating the small- to medium-size computer area, Sweet said.

The 32-bit maker, without a broad range of products and without a volume base to help reduce prices, is left vulnerable to attack from both the higher and lower end, he said.

The minimakers and the mainframe makers, between them, were probably "taking pieces out of Xerox's hide," he said.

Uses Core Memory

Interdata uses core memory on its 32-bit machines, he said, adding that every time he thinks core has reached its natural limit, it extends the limit.

Interdata offers 32K bytes on a core plane and, within a few months, expects to have 64K bytes on a board, he said.

The price of core keeps coming down, he noted. The price of the 32K-byte unit dropped between the time Interdata announced it and the time of shipment.

In addition, core is nonvolatile, supply is no problem, and it is "super reliable," with about 20,000 hours as mean time between failure.

MOS memory, on the other hand, while faster, is volatile, more expensive and unreliable, with about 6,000 hours mean time between failure. In addition, one cannot reproduce the fault in order to fix it, Sweet said.

Interdata and the other mini makers of large machines with core, such as Digital Equipment Corp. and Data General Corp., use MOS in various cache memory schemes to improve the overall execution speed, he said.

Interdata expects shipments of its 8/32 to reach 200 a year initially. The first installation was recently made at Tulane University, he said.

In a principally OEM environment, part of the problem is the lead time for customers to write the machine into their specifications. Now, many users are converting from specifying 24-bit machines to 32-bit units, he said.

Sweet said he agrees with industry figures that the high-performance minicomputer market should grow at about 60% annually, and he expects Interdata to keep up with that rate.

CDC, Ticketron File Countersuit

NEW YORK – Control Data Corp. and Ticketron, Inc. have filed countersuit against American Express Co., asking $31 million in actual and punitive damages.

The suit, filed in New York Supreme Court, Manhattan District, denies all liability of charges brought by American Express of alleged ticketing services deficiencies during American Film Theatre's 1973-74 season.

CDC and Ticketron charged American Express was responsible for the alleged ticketing problems and was in breach of contract with Ticketron for nonpayment.

CDC claimed American Express maliciously disparaged CDC by publishing claims that CDC was responsible for the alleged problems under a contract to which CDC was not a party.

Ticketron, which had the contract, said American Express and the American Film Theatre interfered with the orderly execution of the work contracted.

American Express filed suit against Ticketron and CDC in April, seeking $30 million.

Prime to Use 4K Chips on All Boards

FRAMINGHAM, Mass. – Prime Computer, Inc. is converting to the exclusive use of 4K chips for all its memory boards.

The firm has expanded its assembly operations to include production of MOS memory boards.

Prime began using 4K chips for its 32K boards last November and now uses 4K chips in its 8K and 16K boards as well.

"We expect to totally convert from 1K to 4K memory chips sometime this fall," said Bob Berkowitz, vice-president of manufacturing.

The boards using 4K chips are compatible with earlier memories, and systems may utilize boards with 4K chips along with 1K chip boards, the company said.

Prime has over 150 of its 32K boards using 4K chips operating at customer sites and has experienced no significant reliability problems, the firm said.

Berkowitz attributes part of the reason for Prime's successful implementation of 4K chips to an extended burn-in time. "We operate the chips at elevated temperatures for 14 days. The extended burn-in time causes a defective chip to die during factory testing rather than in a customer installation," he said.

The 4K chip boards were designed to be compatible with existing power supplies and the same memory address and data busses by using on-board regulators to change the supply voltage and by generating the memory timing on the board, the firm said.

"From the beginning, we have used semiconductor memories exclusively in our machines," said Bill Poduska, vice-president of engineering and programming.

"The experience we have gained puts us in an excellent position to quickly incorporate technological improvements such as the 4K chip."

Memorex Reorganizes COM

SANTA CLARA, Calif. – Memorex Corp. has restructured its computer output microfilm (COM) organization, expanding its product planning, marketing support and customer service activities from a central base here.

Donald W. Kelley has been named manager of COM products.

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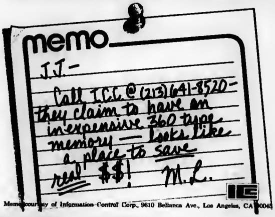

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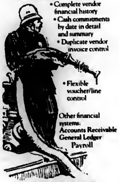

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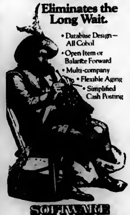

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Recession Affects Data 100 Net Shipments

MINNEAPOLIS – Although Data 100 Corp.'s earnings and revenues increased in both the quarter and six months compared with the year-ago figures, the company said it felt the recession, with net terminal shipments in the second quarter flat compared with those of the 1974 quarter.

"Although gross shipments are up from a year ago, there has been an increase in the number of terminals being returned by customers who are feeling the effects of the recession," said President Edward D. Orenstein.

Backlog as of June 30 was down 28% from the record level at year-end 1974, he said.

"It appears the total value of shipments for the year, including our shipments to other manufacturers, will show only a modest improvement over 1974," he added.

Although orders and shipments in Europe are at record levels, order rates in the U.S. continue to be lower than anticipated. "We are continuing to closely monitor our costs and to limit the hiring of new employees until we see a definite improvement," Orenstein said.

"Provided the U.S. economy improves in the second half, Data 100 should meet its objectives of increasing its revenues and per-share earnings in 1975," he said.

During the quarter, the firm earned $1.6 million or 26 cents a share, including $678,000 in tax credits, compared with $1 million or 20 cents a share in the year-ago period when there was a $427,000 tax credit.

Revenues rose to $22.5 million compared with nearly $16 million in the 1974 quarter.

During the half year, earnings rose to nearly $3 million or 49 cents a share, including $1.3 million in tax credits, compared with $1.9 million or 37 cents a share in the same 1974 period when there was $787,000 in tax credits.

Revenues also rose to $43.4 million compared with $29.9 million in the year-ago period.

During the six months of 1974, nonrecourse sales to third-party leasing companies totaled $9.1 million; there were no such sales in the 1975 six months.

Rental revenues totaled $13 million, a 41% increase from the six-month figure last year. Revenues from recorded sales also rose 41% to $24.3 million for the half year.

Long-Term Leases

Orenstein said the earnings and revenues increases were primarily the result of the continuing high proportion of long-term leases of terminal equipment which the company records as sales.

Data 100 has expanded its European revolving credit lines by $2 million to $14 million, pending completion of routine documentation, the firm said.

It also agreed to finance up to $10 million of lease proceeds with Randolph Computer Corp. Under the agreement, Randolph will pay cash to Data 100 and will receive monthly lease proceeds. Data 100 keeps title, will retain the residuals and provide maintenance.

These agreements bring Data 100's worldwide revolving bank credit line to $56 million and lease proceeds financing to $35 million.

Revenues Down, Earnings Up at Telex

TULSA, Okla. – Telex Corp.'s emphasis on selling rather than leasing equipment was reflected in increased first-quarter earnings, although revenues were down.

But, President S.J. Jatras said, "while we plan to continue to emphasize our sales program of this equipment, it is probably that sales from the lease base cannot be maintained at the high level realized in the first quarter."

Earnings totaled nearly $2 million or 19 cents a share compared with $165,000 or 2 cents a share in the year-ago period.

During the 1975 period, there was a $635,000 tax credit and an $800,000 provision for depreciation compared with a $165,000 depreciation last year.

Revenues reached $27.5 million compared with $29.5 million in the same 1974 period.

The Telex Computer Products Group was profitable in its operations in the U.S., Canada and Europe, bringing in $1.8 million or 17 cents a share compared with a loss of $432,000 or 4 cents a share a year ago, the company said.

As a consequence of the policy of selling equipment from the lease base, rental income decreased to $4.2 million compared with $6.4 million in the year-ago period and $4.9 million in the preceding quarter.

Telex Communications, Inc. incurred a "significant" loss in its home entertainment sector and showed earnings of $159,000 or 2 cents a share compared with $797,000 or 6 cents a share in the same period last year.

Total company backlog at June 30, 1975 was $12.7 million compared with $18.8 million a year ago.

'Excellent Year' Expected at Itel Despite Drop in Six-Month Income

SAN FRANCISCO – Although Itel Corp.'s second-quarter and six-month earnings were down from those of the year-ago periods, President Peter S. Redfield expects 1975, "as a whole, will be another excellent year."

The firm anticipates a record second half, which is traditionally the stronger part of the year, he explained.

"Itel's second-quarter performance conforms to management's previously stated expectations and is due primarily to the impact of worldwide economic conditions," he said.

For the quarter, earnings dropped to $1.7 million or 21 cents a share compared with $2.4 million or 26 cents a share in the year-ago period, when there was a $100,000 tax credit.

Revenues grew to $42.7 million for the quarter compared with $39.6 million in the same period last year.

During the six months, earnings were off to $3.8 million or 43 cents a share compared with $4.5 million or 47 cents a share in the same 1974 period, when there was a $300,000 tax credit.

Revenues rose to $80.9 million compared with $69 million in the year-ago period.

Special Credit Boosts Boothe Net

SAN FRANCISCO – Boothe Computer Corp. turned second-quarter and six-months results into earnings on an operating basis, and a $3.8 million special credit in the second quarter strengthened earnings.

For the quarter, Boothe earned $3.9 million, with a $3.8 million special credit, or 99 cents a share compared with a loss of $557,000 or 25 cents a share in the year-ago period.

Quarterly revenues grew to $11.6 million compared with $9.9 million in the same period last year.

For the six months, the firm's earnings totaled $4 million or $1.01 a share, including the $7.6 million credit, compared with a loss of $1.4 million or 66 cents a share in the year-ago period.

...Toward the Bottom Line

Haefner Loan Approved By Wyly for Datran

DALLAS – Cash-hungry Wyly Corp. has agreed in principle to Walter Haefner Holding AG lending its Data Transmission Co. (Datran) subsidiary an additional $10 million.

This would bring Haefner's investment to $40 million and is Haefner's second $10 million interim loan to Datran.

The loan can be converted into Datran convertible debentures if Wyly shareholders and the Federal Communications Commission consent, the firm said.

Further Haefner investments in Datran are being considered, Wyly said. The most recent loan is guaranteed by Wyly and its subsidiaries and secured by a lien, subject to the rights of other creditors, on the assets of Wyly's University Computing Co. subsidiary.

Other Moves

Reliance Group has concluded a $12 million unsecured revolving credit agreement for 18 months with three Chicago and New York banks. Proceeds will be used to fund working capital requirements.

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Datapoint has received commitments increasing its revolving credit line to $30 million from $12 million with a group of five banks headed by First National Bank of Chicago.

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New Listings: Itel is traded on the New York Stock Exchange under the symbol "I." Memorex is listed on the Pacific Stock Exchange under "MRX."

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Hewlett-Packard has increased its semiannual cash dividend to 15 cents a share, up 5 cents, on the dividend payable Oct. 15 to stockholders of record Sept. 24.

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Earnings Reports

DATA 100
Three Months Ended June 30

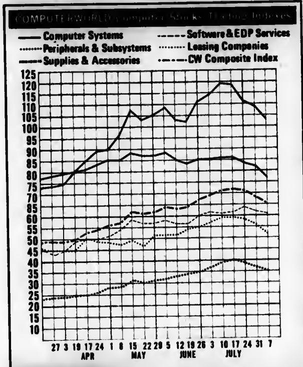
	1975	1974
Shr Ernd	$.44	$.34
Revenue	22,506,000	a15,989,000
Tax Cred	678,000	427,000
Earnings	1,813,000	1,042,000
6 Mo Shr	.84	.63
Revenue	43,358,000	a29,902,000
Tax Cred	1,258,000	787,000
Earnings	2,993,000	1,933,000

a-Includes nonrecourse sales to third-party leasing companies of $4.1 million in the quarter and $9.1 million in the six months.

ELECTRONIC MEMORIES AND MAGNETICS
Three Months Ended June 28

	1975	1974
Shr Ernd	a	$.36
Revenue	$25,236,000	31,282,000
Tax Cred	.....	945,000
Earnings	134,000	2,174,000
6 Mo Shr	.....	.63
Revenue	48,898,000	57,817,000
Tax Cred	.....	1,730,000
Earnings	(260,000)	3,910,000

a-Preferred dividend requirements, for which company is in arrears, exceeded net income.



REYNOLDS & REYNOLDS
Three Months Ended June 30

	1975	1974
Shr Ernd	$.24	$.23
Revenue	19,673,304	18,444,772
Earnings	1,106,175	1,106,316
9 Mo Shr	.90	.84
Revenue	61,061,128	53,841,909
Earnings	4,204,272	3,955,913

SPERRY RAND
Three Months Ended June 30

	1975	a1974
Shr Ernd	$.84	$.77
Revenue	771,178,000	709,684,000
Earnings	29,161,000	26,539,000

a-Restated.

APPLIED MAGNETICS
Three Months Ended June 30

	1975	1974
Shr Ernd	$.06	.....
Revenue	14,992,000	$15,042,000
Earnings	240,000	(1,005,000)
9 Mo Shr	.12	.....
Revenue	46,935,000	43,570,000
Earnings	502,000	(381,000)

DATAPRODUCTS
Three Months Ended June 28

	1975	a1974
Shr Ernd	$.25	$.20
Revenue	18,893,000	21,502,000
Earnings	b1,731,000	1,390,000

a-Restated to treat Data Card Corp. as unconsolidated subsidiary. b-Includes pretax gain of $1.32 million from sale of 61% of holdings in Data Card Corp.

COMPUTER MACHINERY
Three Months Ended June 30

	1975	1974
Shr Ernd	$.06	$.16
Revenue	16,212,000	15,204,000
Tax Cred	140,000	225,000
Earnings	292,000	836,000
6 Mo Shr	.....	.34
Revenue	30,052,000	29,209,000
Tax Cred	140,000	476,000
Earnings	(802,000)	1,773,000

STORAGE TECHNOLOGY
Three Months Ended June 27

	1975	1974
Shr Ernd	$.36	a$.33
Revenue	20,822,000	18,095,000
Earnings	1,420,000	1,234,000
6 Mo Shr	.69	a.63
Revenue	40,320,000	34,329,000
Earnings	2,707,000	2,364,000

a-Adjusted for a 5% stock dividend in March 1975.

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 7, 1975

All statistics compiled, computed and formatted by
TRADE★QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1975 RANGE (1)	CLOSE AUG 7 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	62-109	91 1/4	-4 1/4	-4.4
O	COMPUTER AUTOMATION	2- 10	7 7/8	0	0.0
N	CONTROL DATA CORP	11- 23	17 1/8	- 7/8	-4.8
N	DATA GENERAL CORP	10- 38	28 3/4	-3 1/2	-10.8
O	DATAPOINT CORP	6- 26	19 1/2	-2	-9.3
O	DIGITAL COMP CONTROL	1- 4	4	+ 1/4	+6.6
N	DIGITAL EQUIPMENT	46-122	110 1/2	-1	-0.8
N	ELECTRONIC ASSOC.	2- 3	2 3/4	- 1/8	-4.3
A	ELECTRONIC ENGINEER.	5- 10	8 7/8	+ 3/8	+4.4
N	FOXBORO	23- 42	35 1/2	- 1/2	-1.3
O	GENERAL AUTOMATION	6- 14	9 1/2	-1 1/4	-11.6
O	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	58-120	102 1/4	-5 7/8	-5.4
N	HONEYWELL INC	22- 40	30	-2 5/8	-8.0
N	IBM	158-224	186	-8 7/8	-4.8
O	MEMOREX	1- 10	9 1/8	- 1/4	-2.6
O	MICRODATA CORP	2- 6	4 1/4	- 5/8	-12.8
O	MODULAR COMPUTER SYS	5- 19	14 1/4	-1 1/4	-8.0
N	NCR	15- 39	28 7/8	-1 7/8	-6.0
O	PRIME COMPUTER INC	2- 6	5 3/4	0	0.0
N	PERKIN-ELMER	16- 30	24 7/8	- 3/4	-2.9
N	RAYTHEON CO	26- 59	47 1/4	-2 1/4	-4.5
N	SINGER COMPANY	10- 17	12 9/8	-1 1/8	-8.1
N	SPERRY RAND	26- 49	40 3/4	-1 3/8	-3.2
A	SYSTEMS ENG. LABS	1- 5	3	- 3/8	-11.1
O	ULTIMACC SYSTEMS INC	1- 6	6	- 5/8	-9.4
N	VARIAN ASSOCIATES	7- 19	13 5/8	-1 5/8	-10.6
N	WANG LABS.	7- 17	11 3/4	-1 1/2	-11.3
N	XEROX CORP	51- 86	59 5/8	-1 5/8	-2.6

LEASING COMPANIES

EXCH		1975 RANGE (1)	CLOSE AUG 7 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 5	3 1/2	0	0.0
A	COMMERCE GROUP CORP	2- 4	3	- 1/8	-4.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	0	0.0
N	DATRONIC RENTAL	1- 1	5/8	0	0.0
A	DCL INC	1- 1	1/2	-	-11.1
N	DPF INC	3- 6	4 5/8	- 1/2	-9.7
O	EDP RESOURCES	2- 2	1	-1	-50.0
A	GRANITE MGT	1- 5	3 3/4	- 1/4	-6.2
A	GREYHOUND COMPUTER	2- 3	3	0	0.0
A	ITEL	3- 9	6 5/8	- 3/4	-10.1
N	LEASCO CORP	4- 8	7 3/4	+ 5/8	+8.7
O	LEASPAC CORP	1- 1	1/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	1- 4	2 7/8	- 1/8	-4.1
A	PIONEER TEX CORP	2- 7	5 1/4	+ 1/8	+2.4
A	ROCKWOOD COMPUTER	1- 1	5/8	0	0.0
N	U.S. LEASING	9- 14	9 3/4	-1 1/2	-13.3

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1975 RANGE (1)	CLOSE AUG 7 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 1	1	+ 1/8	+14.2
A	APPLIED DATA RES.	1- 10	2 1/5	0	0.0
N	AUTOMATIC DATA PROC	29- 65	53	-7 1/2	-12.3
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	3- 6	6 1/2	+1	+18.1
O	COMPUTER DIMENSIONS	2- 6	4 1/2	0	0.0
O	COMP ELECTION SYSTMS	3- 6	5 3/4	+ 7/8	+17.9
O	COMPUTER HORIZONS	1- 1	3/4	0	0.0
O	COMPUTER NETWORK	1- 3	2 3/8	0	0.0
N	COMPUTER SCIENCES	2- 6	4 3/4	- 5/8	-11.6
O	COMPUTER TASK GROUP	1- 1	5/8	0	0.0
O	COMPUTER USAGE	2- 4	2 3/8	+ 1/8	+5.5
O	COMSHARE	3- 4	2 7/8	- 1/4	-8.0
O	DATATAB	1- 2	1 9/8	0	0.0
O	ELECT COMP PROG	1- 1	1/4	0	0.0
N	ELECTRONIC DATA SYS.	12- 28	17 1/2	-1 1/2	-7.8
O	INFONATIONAL INC	1- 1	1/9	0	0.0
O	IRS COMPUTER MARKET.	1- 1	1/2	- 1/8	-20.0
O	KEANE ASSOCIATES	2- 3	2 1/4	0	0.0
O	KEYDATA CORP	2- 3	2 5/8	- 1/8	-4.5
O	LOGICON	3- 5	3 3/4	- 1/4	-6.2
A	MANAGEMENT DATA	1- 3	2 1/8	0	0.0
O	NATIONAL CSS INC	6- 14	9 1/4	+ 1/4	+2.7
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 17	13 1/4	-2	-13.1
N	PLANNING RESEARCH	2- 6	3 3/4	- 1/4	-6.2
O	PROGRAMMING & SYS	1- 1	5/8	- 1/8	-16.6
O	RAPIDATA INC	2- 5	3 3/4	- 3/8	-9.0
O	REYNOLDS & REYNOLDS	11- 24	13 1/2	- 1/2	-3.9
O	SCIENTIFIC COMPUTERS	1- 1	1	0	0.0
O	SIMPLICITY COMPUTER	1- 1	5/8	0	0.0
O	TYMSHARE INC	7- 21	16 1/4	-1 1/8	-6.4
A	URS SYSTEMS	2- 4	3	- 1/8	-4.0
N	WYLY CORP	2- 4	3 5/8	- 3/8	-9.3

PERIPHERALS & SUBSYSTEMS

EXCH		1975 RANGE (1)	CLOSE AUG 7 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	4- 9	6 1/8	- 5/8	-9.2
O	ADVANCED MEMORY SYS	1- 7	5 3/8	+ 1/4	+4.8
N	AMPEX CORP	3- 7	5 5/8	- 3/4	-11.7
O	ANDERSON JACOBSON	1- 3	2 1/2	- 1/8	-4.7
O	BEEHIVE MEDICAL ELEC	1- 5	3 3/4	+ 1/8	+3.4
A	BOLT,BERANEK & NEW	5- 13	9 3/8	+ 1/8	+1.3
N	BUNKER-RAMO	4- 8	5 1/8	- 1/2	-8.8
A	CALCOMP	4- 7	5 1/8	- 5/8	-10.8
O	CAMBRIDGE MEMORIES	3- 5	4	- 5/8	-13.5
N	CENTRONICS DATA COMP	7- 25	17 1/4	-1 5/8	-8.6
O	CODEX CORP	18- 38	32 1/4	-2	-5.8
O	COGNITRONICS	1- 2	1 3/8	- 1/8	-8.3
O	COMPUTER COMMUN.	1- 2	1 1/4	- 1/8	-9.0
O	COMPUTER CONSOLES	3- 7	9 1/2	+ 1/4	+4.7
A	COMPUTER EQUIPMENT	1- 2	1 3/4	- 1/8	-6.6
O	COMPUTER MACHINERY	1- 2	1 5/8	- 1/8	-7.1
O	COMPUTER TRANSCEIVER	1- 2	1 1/8	0	0.0
O	CONTEN	2- 5	3 7/8	- 1/4	-6.0
N	CONRAC CORP	12- 23	18 1/2	- 1/4	-1.3
O	DATA ACCESS SYSTEMS	1- 3	2 1/4	0	0.0
O	DATA 100	5- 16	9 3/4	- 3/8	-3.7
A	DATA PRODUCTS CORP	2- 6	4	- 1/4	-5.8
O	DATA TECHNOLOGY	1- 3	1 5/9	0	0.0
O	DATUM INC	1- 2	1 5/8	- 1/4	-13.3
O	DECISION DATA COMPUT	4- 7	4 3/4	- 3/8	-7.3
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
O	DIVAN CONTROLS	1- 1	1 1/2	0	0.0
N	ELECTRONIC M & M	1- 3	2 1/8	- 1/8	-5.5
O	FARRI-TEK	1- 1	1 1/4	0	0.0
O	GENERAL COMPUTER SYS	1- 2	1 3/4	- 1/4	-12.5
N	HAZELTINE CORP	3- 6	4 5/8	+ 1/4	+5.7
N	HARRIS CORP	18- 28	23 3/4	- 5/8	-2.8
A	INCOTERM CORP	3- 12	10 3/4	- 1/2	-4.4
O	INFOREX INC	2- 5	3	0	0.0
O	INFORMATION INTL INC	8- 14	12 7/8	- 5/8	-4.6
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/2	- 1/8	-20.0
A	MILGO ELECTRONICS	8- 24	18	-1 3/4	-8.8
N	MOHAWK DATA SCI	1- 5	3	+ 1/4	+9.0
O	OPTICAL SCANNING	1- 3	3	+ 1/4	+9.0
O	PENRIL CORP	2- 2	1 3/4	0	0.0
O	PERTEC CORP	2- 8	5 7/8	- 1/5	-2.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	1- 1	1	0	0.0
O	QUANTOR CORP	2- 6	4 3/4	- 1/8	-2.5
O	RECOGNITION EQUIP	2- 9	6 3/4	- 3/8	-5.2
N	SANDERS ASSOCIATES	3- 11	7 5/8	+ 5/8	+8.9
O	SCAN DATA	1- 3	2	- 1/4	-11.1
O	STORAGE TECHNOLOGY	6- 17	13	-1 1/8	-7.9
O	SYCOR INC	5- 15	12 1/2	+1 1/2	+13.6
O	T BAR INC	3- 6	5 1/2	+ 1/4	+4.7
O	TALLY CORP.	1- 5	3 3/8	0	0.0
O	TEC INC	1- 4	3 1/2	0	0.0
N	TEKTRONIX INC	18- 41	34	-1	-2.8
N	TELEX	1- 3	2 1/2	- 1/8	-4.7
O	WANGCO INC	4- 9	6 3/8	- 5/8	-8.9
O	WILTEK INC	1- 4	2 1/2	- 1/2	-16.6

SUPPLIES & ACCESSORIES

EXCH		1975 RANGE (1)	CLOSE AUG 7 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	4- 5	4 1/2	0	0.0
A	BARRY WRIGHT	5- 7	6 1/2	- 1/8	-1.8
O	CYBERMATICS INC	1- 1	1/2	- 1/8	-20.0
A	DATA DOCUMENTS	29- 42	34 1/2	+ 1/2	+1.4
O	DUPLEX PRODUCTS INC	12- 25	18 1/8	0	0.0
N	ENNIS BUS. FORMS	5- 7	5 7/8	0	0.0
O	GRAHAM MAGNETICS	5- 10	8 1/4	+ 1/4	+3.1
O	GRAPHIC CONTROLS	8- 21	12 1/8	-1 1/8	-8.4
N	3M COMPANY	43- 68	56 1/2	- 1/2	-0.8
O	MOORE CORP LTD	39- 51	46 1/4	-2 1/4	-4.6
N	NASHUA CORP	14- 22	13 7/8	-1 3/4	-11.1
O	STANDARD REGISTER	11- 20	16 1/2	-1 1/2	-8.3
O	TAB PRODUCTS CO	4- 8	5 3/4	- 3/4	-11.5
N	VARCO	17- 24	21 1/2	- 1/2	-2.2
O	VANIER GRAPHICS CORP	4- 7	4 3/4	- 3/4	-13.6
A	WABASH MAGNETICS	3- 5	4 1/8	- 1/8	-2.9
N	WALLACE BUS FORMS	15- 25	19 1/4	-1 1/4	-6.8

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